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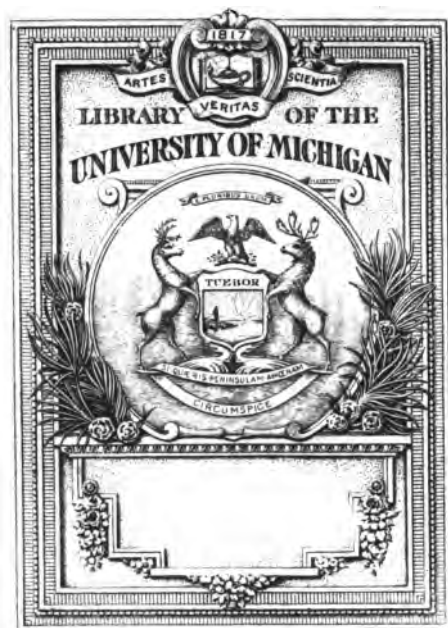
REPORT OF

GEO. E. STANFORD

COMMISSIONER OF REVENUE

1912

NASHVILLE



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STATE OF TENNESSEE. *Mining Dept.*

TWENTY-SECOND ANNUAL REPORT

OF THE

Mining Department

COMPLIMENTS OF THE

MINING DEPARTMENT OF TENNESSEE.

The annual report edition of the Mining Department being limited, the names of those failing to acknowledge receipt of the book will be stricken from the mailing list. Editors of periodicals will please forward copy of issues containing notice of review.

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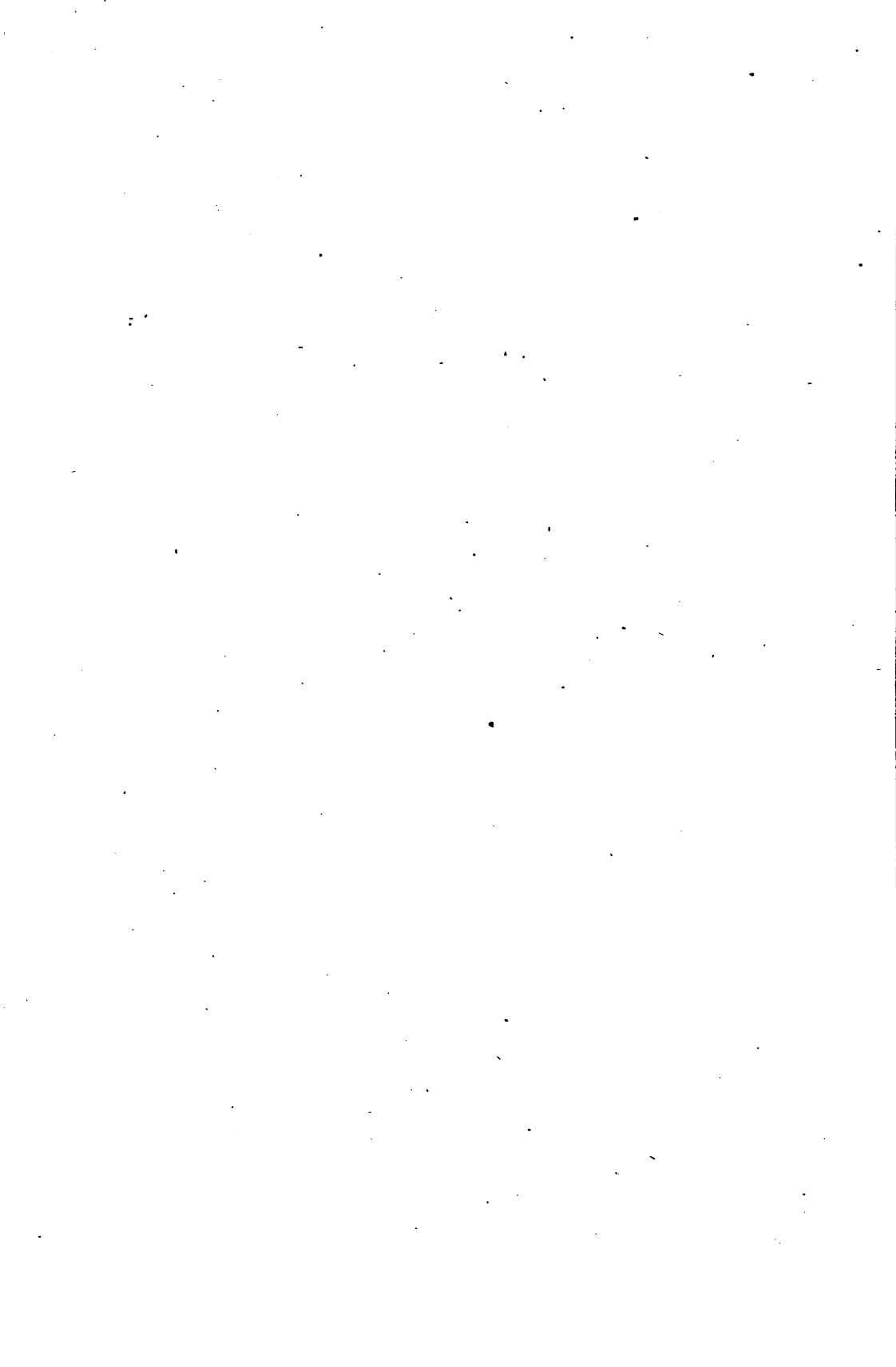
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LETTER OF TRANSMITTAL

OFFICE OF CHIEF MINE INSPECTOR.

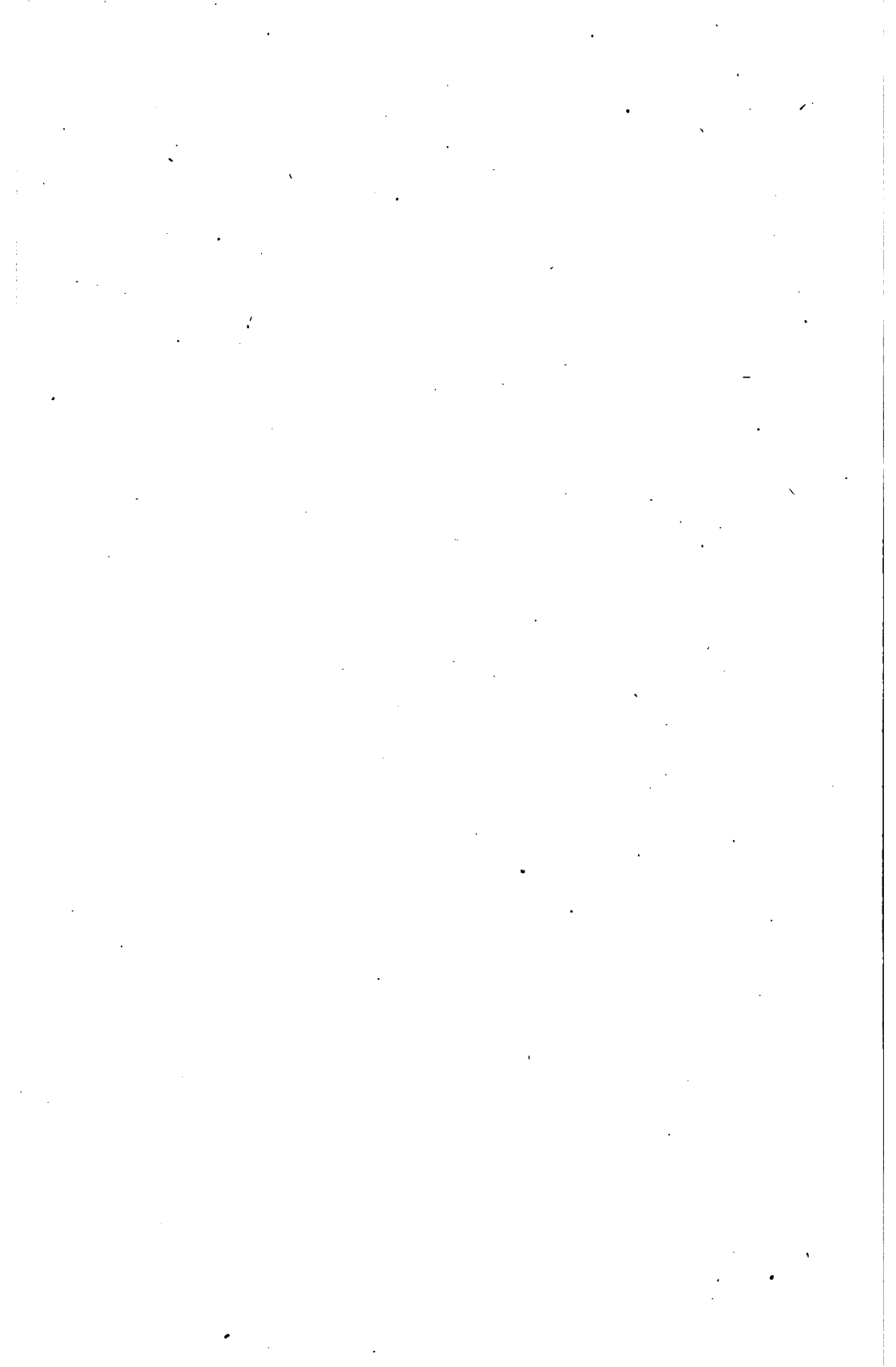
NASHVILLE, TENN., Dec. 1, 1913.

To His Excellency, Hon. B. W. Hooper, Governor of Tennessee.

DEAR SIR: I herewith submit to you the Twenty-Second Annual Report of this Department, embracing the mineral resources of Tennessee for the year 1912.

Very respectfully,

GEO. E. SYLVESTER,
Chief Mine Inspector.



INTRODUCTION

In this report, as in the one of 1911, that part pertaining to coal has been treated, as far as possible, separately from that of the other mineral products. As the work of this department is largely the inspection and regulation of coal mines, coal is treated in greater detail than that of other mineral operations.

Those of the other mineral operations which are conducted by underground mining, and therefore subject to inspection, are comparatively few. A description of these mines has been included in this report and follows that of the coal mines, but the statistics and general information as to the operation is included with that of the other mineral products in the second part of this report.

There has been no change in the personnel of the department, with the exception of the resignation of Joseph Richards, District Inspector for the eastern district, which occurred on December 1, and the appointment of H. H. Braden as his successor.

The present personnel of the department being:

GEO. E. SYLVESTER, *Chief Mine Inspector.*

JOHN ROSE, *District Mine Inspector.*

H. H. BRADEN, *District Mine Inspector.*

W. A. OVERALL, *Statistician.*

WILLIAM YORK, *Clerk.*

H. B. JACKSON, *Stenographer.*

The statistics in this report are compiled by the department with great care, and are as nearly complete as it is possible to get them.

We wish to express our appreciation for the promptness with which a large majority of the operators send us this information. We regret to state, however, that there are still a few who, through carelessness or oversight, fail to get their reports to us on time. This necessarily retards the work, as the statistics can not be compiled until our information is complete.

It has been the aim of this department to give, as far as possible, individual credit for all matter taken from other sources, and while this is not always possible in matter used in comparative tables, etc., such matter shows in itself that it is outside compilation.

I wish here to make special acknowledgment to the Statistical Department of the U. S. Geological Survey and to the Bureau of Mines for the help and coöperation with this department. Also to acknowledge the many favors received from the State Geological Department.

I desire to make grateful acknowledgment of the faithful and efficient work of District Inspectors Rose and Braden, not only in the field but in furnishing material for this report. Much credit is also due the office force, upon whom the burden of the work of this report falls.

COAL

The coal mines of Tennessee, for the purpose of comparative statistics and also for inspection, are divided into three districts. These districts are not entirely arbitrary, but represent to a great extent individual conditions not only with reference to the character of coal mined, but also market conditions and transportation facilities.

The first, or western district, comprises a group of eight counties in the western part of the coal field and extending from the Alabama and Georgia lines on the south to within a few miles of the Kentucky line on the north, embracing the counties of Marion, Grundy, Sequatchie, Bledsoe, Cumberland, Overton, Scott and Fentress.

The mines are located along the lines of the Nashville, Chattanooga and St. Louis Railway, and the Tennessee Central Railroad, or their branches. The seams worked are chiefly the lower seams.

The seams are in some localities more disturbed and irregular than those of the eastern field, and most of the mines are damp or wet, with little or no gas.

The second, or middle district, extends from Chattanooga on the south to Scott County and the Kentucky line on the north, and embracing those counties lying along or contiguous to the line of the C. N. O. & T. P. Railroad.

This district, in character of coal and conditions of mining, partakes more or less of the nature of both the eastern and western districts, although it has individual characteristics.

The coal in the southern part lies along and under Walden's Ridge, and includes the most disturbed coal in our field, while that in the northern part partakes more of the nature of the eastern district.

The majority of the mines in this district are damp and non-gaseous, yet it contains some dry and dusty mines; and although those having gas are few, they include the most gaseous mines in the State.

While this district produces only 19 per cent of the coal of the State, it produces 62 per cent of the coke, representing 69 per cent of the coke value.

The third, or eastern district, lies in the extreme northeastern part of the coal field, and embraces the counties of Anderson, Campbell, and Claiborne. Notwithstanding this district comprises a smaller territory than either of the other districts, it produces more coal than both of them combined.

The mines lie along the lines of the Louisville and Nashville and Southern railroads and their branches. The upper seams are worked. The seams are more uniform and regular than in the western district; usually a freer burning and more of a block coal, and none of the seams worked are represented in the western district.

Many of the mines are inclined to be naturally dry, some dusty. A little gas is sometimes found in a number of these mines; however, in the absence of dust, not enough to give concern.

While the production in this district has decreased since 1910, there is much undeveloped coal which could be made available.

In regard to inspections: The first and second districts, with the exception of Morgan County, is assigned to District Inspector John Rose, with headquarters at Dayton, Tenn.

The third district is assigned to District Inspector H. H. Braden, with headquarters at Oliver Springs, Tenn. Morgan County is divided between the two district inspectors.

The amount of coal produced in the State of Tennessee in 1912 was 6,578,754 short tons, valued at \$7,422,703. This was an increase in production over 1911 of 112,530 short tons. Taken by districts, this shows a gain of 200,260 tons in the first, or western district, and a gain of 37,820 tons in the second, or middle district; while the third, or eastern district, shows a loss of 125,550 tons.

The principal gain shows in the first district. While nearly all of the counties in this district show a slight gain, the greater part of it comes from Marion County.

With reference to the loss in the third district: Claiborne County varies but little, showing, however, a small loss, while Campbell County makes some gain. The greatest loss appears in Anderson County, and can be traced largely, if not entirely, to the Coal Creek section and surrounding mines. The slow recovery of the Cross Mountain mine from the effect of the disaster resulting from the explosion during the previous December, caused the greater part of the product of this mine to be cut off for some time. This, together with the labor troubles and car shortage which occurred during the spring and summer in that section, accounts measurably for this loss.

In asking for the revisions of the descriptive reports of the various mines which are made by the district inspectors, I have also asked that they submit general reports covering the conditions in their respective districts, together with such general information covering their work as they might be able to furnish.

These reports are in addition to the regular reports on each mine inspected, and which are sent in as soon as possible after the inspections are made, and the monthly reports of the number of inspections made during each month.

These special reports are given herewith, the descriptive matter relative to the mines, as heretofore, appearing in its proper place.

REPORT OF JOHN ROSE, DISTRICT MINE INSPECTOR, MIDDLE AND WESTERN DISTRICT.

DAYTON, TENN., January 1, 1913.

Mr. George E. Sylvester, Chief Mine Inspector, Nashville, Tenn.

DEAR SIR—As District Mine Inspector, for the middle and western divisions of the State, embracing the coal mines in the counties of Scott, Roane, Rhea, Hamilton, Bledsoe, Sequatchie, Marion, White, Grundy, Overton, Fentress, Cumberland and a portion of Morgan; also the iron mines of Roane and Meigs counties, I hereby submit to you a descriptive report of the mines in the district, and the work performed by me during the year 1912. The coal mines of Roane County, and the Fall Creek mine in Cumberland County, being inspected by the Chief Mine Inspector, and are not included in this report.

The fourteen counties which form this mining district extend from the Kentucky line, southward along the Queen and Crescent Railroad to the Alabama border; and westward along the Tennessee Central, the Nashville, Chattanooga and St. Louis railroads, and their branch lines. The territory covered by this district is so extensive, and the mines operating so numerous, to comply with the mining statute in regard to the number of inspections made, requires an assiduous effort on the part of the field inspector.

During the time covered by this report I have visited and inspected 75 coal mines and 8 iron mines, making a total of 204 coal mine inspections and 16 iron mine inspections. To visit the different mines in the district, in order to make this number of inspections, it was necessary to travel 5,800 miles by railway and 325 miles by livery conveyance.

The coal mines of the district are composed of 2 shaft mines, 3 slope mines and 70 drift mines. The iron mines are all slope mines. The average thickness of the coal

seams of the district is about 37 inches, and the iron seams measure about 48 inches in thickness.

Based on the number reported to me at each inspection, there were employed in the coal mines of the district during the year a daily average of 2,407 men and 296 mules, and in the iron mines 281 men and 46 mules. The State mine, which employs an average of 370 convicts and 29 mules, is not included in these figures.

The method of mining in the district is chiefly by solid shooting with black powder. There are only 12 mines in the district in which the coal is undercut even in part by mining machines, and in which 15 machines of the chain type and 46 of the puncher type are used. For inside haulage, there are 3 mines in which gasoline motors are used (4 motors used), and 10 mines in which electric motors are employed (30 motors used). Five mines have rope haulage.

Eight fatal and 68 non-fatal accidents have been reported in this district, most of which can be traced, in a great measure, as usual, to carelessness on the part of the miner.

During the first half of the year the mining industry was rather dull, and many of the mines in the district did not operate steadily; but the last half has been one of unprecedented material progress in every respect, both as to tonnage of coal mined and demand for same.

There have been a few small new mines opened up in the district during the year. While there has been no great improvement noted in, or about the mines, in a general way, yet there has been considerable work of a substantial character accomplished in the way of installing ventilating fans and hoisting engines, making air shafts, erecting ventilating furnaces and improvement in tipping facilities; but still there is need of much more improvement in and about many of the mines in the district before satisfactory conditions will be attained.

Generally speaking, the ventilation, safety and sanitary conditions of most of the mines in the district are fairly good, while in some of the larger ones they are excellent. But few mines in the district generate explosive gas, or have dust of a dangerous character, but wherever either of these dangerous elements have been found, even in small quantities, I have insisted that the circulating current be improved or the moisture increased to the extent that these dangerous factors be removed or rendered harmless.

In most of the larger mines there is a ready willingness on the part of operators and mine officials to comply with the mining laws of the State, and to promptly adopt any measure, suggestion or recommendation I have offered to insure the protection and safety of their employes, or better the sanitary conditions of their mines. In some of the smaller mines, however, the attention given to the legal requirements for the safety and comfort of miners is not what it should be.

One of the greatest problems and troubles confronting the Mine Inspector in this district is the lack of knowledge of the mining laws, and a lack of discipline, and power to enforce rules and regulations which would insure safety to miners in many ways. To this inefficiency on the part of mine foremen may be attributed, in a very great measure, many of the silent and almost unnoticed and unheard-of accidents occurring so frequently, here and there, in the coal mines, and in the end aggregating hundreds. Some mine foremen are competent and efficient in all other duties, but sadly deficient in discipline. Rules and regulations posted at mines, but not enforced on the inside, are about equivalent to no rules or discipline. If rigid rules and discipline are needed anywhere, it is surely needed in the coal mine, where the life of the careful miner is so often endangered by the carelessness of the average miner.

Whenever opportunity presented itself, I have endeavored to infuse into both foreman and miner alike a desire to familiarize themselves with the State Mining Statutes; the principles and benefits of practical mine ventilation; the importance and necessity

of having comfortable and sanitary mine conditions; the need of better mine discipline, and the cultivation of the habit of doing things well, hoping and believing the habit thus formed and the knowledge thus acquired, would not only be useful in the development and production of the mine, but would also be the means in the end of bringing the mine conditions up to the desired standard. To a certain extent I feel that the efforts made in this direction have not been altogether a failure, for one of the encouraging features to be noted is a rapidly growing spirit of inquiry and a thirst and desire on the part of many miners to know things for themselves.

In many mines during the latter part of the year there has been a scarcity of men, and a disposition on the part of many miners to work very irregularly. Operators in some instances are responsible, to a very great extent, for this state of affairs. Good mine discipline, pleasant and comfortable mine conditions, good ventilation, good tracks, good drainage, and good traveling ways as far as possible, means not only a larger production and output of coal for the operator, but brings about better contentment and more interest on the part of the better class of miners and a closer relationship between both operator and miner. Operators, who neglect discipline and the sanitary conditions of their mines, and the comfort and safety of their men, for the sole purpose of obtaining another ton or making another dollar today, soon lose the respect and confidence of his miners, the better class leaving and going to mines where system is enforced and conditions are better. The example and influence of one industrious and law-abiding miner leaving a mine camp on account of the disagreeable conditions of its mines, is equal to the arrival in camp of four worthless miners or characters.

From superintendents, foremen and miners I have received the very best of treatment and assistance in the performance of my official duties, for which I desire to show my full appreciation by extending thanks for all these courtesies. And in conclusion I wish to extend to you as Chief Mine Inspector and head of this department my sincere thanks for the advice and assistance rendered me and the confidence you have reposed in me as one of your field inspectors.

JOHN ROSE,
District Mine Inspector.

REPORT OF H. H. BRADEN, DISTRICT MINE INSPECTOR
EASTERN DISTRICT.

OLIVER SPRINGS, TENN., January 1, 1913.

Mr. Geo. E. Sylvester, Chief Mine Inspector, Nashville, Tenn.

DEAR SIR—As District Mine Inspector for the Eastern District of the State, I submit to you herewith descriptive reports of the mines in my district, together with a general report of the work done in this district during the year 1912.

This inspection district includes the coal mines in the counties of Anderson, Campbell and Claiborne, and in a part of Morgan County. The copper and zinc mines in Polk, Knox and Jefferson counties being inspected by the Chief Mine Inspector, and hence are not included in this report.

On account of entering upon my duties as District Inspector only a short time before the close of the year, the details of this report must, of necessity, be somewhat limited.

I inspected during the year, 82 coal mines, of which 77 were drift and 5 slope mines. There are no shaft mines in this district. Of the mines inspected, 15 were in A, 8 in B, and 59 in C classification. During the year there were 10 fatal and 52 non-fatal accidents reported, which was a smaller number than usual. A large per cent of the

coal mined was undercut with machines, there being 127 of the puncher type and 40 chain machines used. For haulage there are 30 mines in which electric motors are used, 4 using gasoline motors, and one mine in which a steam locomotive is used, and 8 mines have rope haulage.

Ventilation in the mines in this division is fairly good, and especially so in the larger mines.

Some of the mines are inclined to be dry and some which generate small amounts of gas. Where I found either of these dangers existing I have given such recommendations and instructions as would tend to greater safety, especially as regards ventilation and the removal of dust, and keeping the mines in a moist condition.

I have also recommended the use of permissible explosives where gas or dust existed, even in small quantities. Most of the more dusty mines are using permissibles exclusively or employ shot firers.

There seems to be a general willingness on the part of the management of the mines to comply with the mining laws, and to cooperate with the department to the end of greater safety. This, in a more marked degree, among the larger operators, some of the smaller mines being somewhat lax in the matter of discipline and in keeping the mines in good condition.

I have endeavored to impress on both operator and miner the necessity for good discipline, strict adherence to the State mining laws, and the importance of cooperation in enforcing rules and regulations pertaining to safety in and around the mines.

Respectfully submitted,

H. H. BRADEN,
District Mine Inspector.

From the above it may be noted that while the territory embraced in Mr. Rose's district is very much larger than in Mr. Braden's, it has a smaller number of mines; however, when the iron ore mines are included there is really but little difference. The output and number of men employed, however, are considerably less.

The eastern district has a much greater per cent of machine-mined coal, and also of mechanical haulage, and includes more of the larger mines.

LABOR TROUBLE AND CAR SHORTAGE.

Seven mines reported labor troubles, lasting from 14 to 90 days, averaging 44 days to the mine. The average number of men idle, to the mine, for the 44 days, was 93.

Eight mines reported car shortage, varying in extent from a few days to three or four months, which accounts for idleness at these mines for a considerable time.

NEW MINES.

During the year there were eight new mines added to the list. They are included in the general list and are as follows:

<i>Name</i>	<i>Operator</i>	<i>County</i>
Davidson.....	Laurel Creek Coal Co.....	Fentress
St. Anthony.....	New Etna Coal Co.....	Marion
Pryor Ridge 4.....	Tennessee Consolidated Coal Co.....	Marion
Glen Mary 0.....	Glen Mary Coal & Coke Co.....	Scott
Stanley 6.....	Stanley Coal Co.....	Scott
Wilson.....	Virginia Mining Co.....	Scott
Big Block.....	United Mining Co.....	Campbell
High Cliff.....	High Cliff Coal Co.....	Claiborne

DEATH RATE AND ACCIDENTS.

There were 18 fatal accidents reported for the year 1912, 16 of which were inside and 2 on the surface. This was the smallest number of accidents reported since 1900, and considering the amount of coal mined and men employed, it is the smallest since this record has been kept.

While this department has done all that it could to reduce the accident rate, I do not think this unusual record can be attributed to any special action or care on the part of the inspectors.

It is only where a very large number of mines are considered, as for example, in our larger mining states, or in the United States as a whole, that these statistics can be made to represent averages. An abnormal decrease in accidents, such as the report shows for this year, can not be taken as representative any more than an abnormally high rate, such as occurred the year before, could be so considered.

While we can not expect to better or even hold the present low rate, we do hope that by the exercise of constant care and diligence on the part of all parties concerned, the average death rate may gradually be lowered.

The non-fatal accident report also shows a considerable decrease. While this may be taken as encouraging, the difficulty of uniform classification, even between the different mines, make it of value for approximate comparisons only; for what might at one time, or by one management, be regarded as an accident too trivial to be noticed, a similar accident at another time or at another mine might be reported. This applies even with more force in making comparisons between the different states.

CAUSES OF ACCIDENTS.

While the question of the causes and preventions of accidents was taken up at some length in the 1911 report, the subject is of so much importance that I feel it should again be considered.

A large per cent of all mine accidents may be classified under the three general causes, namely, natural causes, ignorance and carelessness. The two latter, which usually include much the greater number, may be considered as preventable. We do not expect ever to be able to prevent anywhere near all of such accidents, for that which may appear to have been a case of gross carelessness after the accident has occurred, may not have so appeared before it occurred. There are a sufficient number of such accidents, however, that could have been averted by the exercise of ordinary caution, and some in which the element of carelessness seems to enter to almost a suicidal degree, to call for improvement in this line that will bring about the greatest reduction in the matter of accidents.

What we might properly designate as over-confidence, which term applies to both operator and miner in an equal degree, has been the cause of many accidents. The fact that a place was safe yesterday, or that it has been safe every day for the past month, naturally leads to the belief that it is safe today, although the examinations have not been made and the usual precautions have not been taken.

The man working under a plainly dangerous top will be pretty sure to take down or thoroughly prop before beginning his work, while the man working under an apparently good top may not even take the precaution to sound the top, totally ignorant that his last shot has uncovered a slip which leaves a bad piece of slate ready to fall.

The foreman, who is in the mine every day, may fail to realize that his mine is slowly getting dryer and more dusty; to him it is as good as it was last week, or last month, or last year, during which time nothing has happened, so he concludes that it is still safe today.

The fact that it is hard to tell just when the danger line was passed further complicates the problem; so that the only way is to make the margin of safety as wide as possible. That nothing did happen does not prove that the mine is safe now or was safe last month or last year. These are points that I feel both miner and operator might well consider. The matter of discipline also has a very important bearing on this question of the prevention of accidents. When the miner knows that there is no penalty for the disobedience of an order, rule or regulation, such orders, rules and regulations very soon become to him a dead letter, hence there will be no way to protect the careless miner against himself, or the careful miner against his more careless fellow worker.

This lack of proper discipline usually results in the gradual elimination of the better class of men, thereby lowering the standard of labor, with its resulting increase of accidents and inefficiency. I find that this laxity in discipline is entirely too prevalent in some of our mines, and that the cause, "Disobedience of Orders," would not be given so frequently on our reports if we had better discipline.

Another item which I would be glad to see eliminated is that of coal or slack for tamping holes. With mines using black powder, and especially those shooting on the solid, the windy shot can not be altogether prevented. In the presence of gas or dust such a shot is very dangerous and many disastrous explosions can be traced to this as a first cause. In the wet non-gaseous mines, while not being so dangerous, its effect on the brattices and ventilation is very bad. It usually represents total loss to the miner, and in such mines our record shows serious accidents have been caused by shots where the tamping was slack coal. Experience has demonstrated that with clay for tamping, not only is the windy shot less liable to occur, but the result of the shot is usually more effective even when it does not produce a "windy". Clay is now used in most of our dry or dusty mines and I hope to see its increased use even in the wet, non-gaseous mines.

During the year 1912 we had no mine fire or explosion of a serious nature. The lesson taught by the recent disastrous explosion at Briceville no doubt had its influence in keeping the mines in better condition than heretofore. It will also be remembered that the winter of 1912 was much milder than usual, presenting a weather condition which was favorable to keeping the mines in a damper condition.

GAS AND DUST.

We have but few mines where gas alone constitutes a serious element of danger, and while our vigilance should not be relaxed in this regard, we must realize that it is the question of dust which constitutes the greatest danger of disastrous explosions.

In the 1911 report the subject of dust was treated at considerable length. At present the free use of water, and in many cases the humidification of the mine with steam—as there are many cases where it is impracticable to get water to all parts of the mine—seems to be the most effective preventive measures. It must be remembered, however, that experiments and observations by the Bureau of Mines, and our other best authorities, together with reports from various mine explosions, tend to show that our knowledge of this subject is limited, and that the danger, even between wide latitudes, can not be positively determined.

In view of all of these things, permissible explosives should be used exclusively in all mines where the question of dust is or may be a menace. Experiments and experience show that this is a very strong factor for safety, in that it eliminates that most dangerous cause, the windy shot.

MINE FIRES.

While the State, thus far, has been free from disastrous mine fires, and nothing serious along this line has occurred during the past year; yet we are by no means immune from this danger.

Proper regulations and precautions should be used in all places where any danger from this cause may exist, and especially around stables or other places where inflammable material is found.

MINING LAWS.

No special change in the mining code is recommended at this time, except that some slight technical changes in the present law might be advantageous. I do think, however, that we should have some legislation on "*first aid and rescue work*".

MINE FOREMEN'S EXAMINATION.

There were two mine foremen's examinations held during the year, one, May 17-18, and one December 27-28. At the May examination 34 applicants were examined, and certificates issued to the following:

CLASS A

R. C. Bledsoe
W. P. Hammack
M. F. Hatfield
Matt Poole
E. B. Sutton

CLASS B

B. L. Adams
George Cagley
John Collins
F. A. Derrick
T. C. Gallegly
John Kasee
R. F. Pope
J. C. Rogers
J. L. Slusher

At the December examination 14 applicants were examined, and certificates issued to the following:

CLASS A

J. E. Hendren
J. W. Ivester
N. D. Wilson

CLASS B

J. F. Hendren
Frank Sellars
J. C. Sliger
T. J. Suggs
J. L. Thom

FIRST AID AND MINE RESCUE WORK.

At the beginning of the year 1912 there were no organized working first aid corps, with the exception of the Whitwell mines, where some work along this line had been done. This movement, however, was taken up early in the year at a number of the mines, the Tennessee Copper Co. being one of the first to do so. During the first part of the year the interest in this matter was not as active as it might have been, nor as active as we would have liked to see, but later in the year we were glad to note that the interest increased.

On October 26 a "Miner's Field Day" was held at Knoxville under the auspices of the Tennessee Mine Foremen's Society. At this meet prizes were offered for the best drilled teams. Those competing were:

Roane Iron Company.....	One team
Campbell Coal Company.....	Two teams
Black Diamond Coal Mining Company.....	One team
Royal Coal & Coke Company.....	One team.
Red Ash Coal Company.....	One team
Coal Creek Coal Company.....	One team
Grasselli Chemical Company.....	One team
Piedmont Coal Company.....	One team
Knoxville Iron Company.....	One team
Tennessee Coal & Iron Company.....	One team
LaFollette Coal & Iron Company.....	One team

The exact figures are not available, but there were probably over 100 men trained in this work during the year.

This movement of first aid is one which should be given every encouragement, for it not only affords a possibility of saving life, but by having men trained in the work available at the time of an accident, much unnecessary suffering can be prevented. And in many cases the length of time the wounded are incapacitated would be greatly reduced.

MINE RESCUE WORK.

There are two mines in the State maintaining mine rescue oxygen apparatus, namely, Rockwood and Whitwell. The Bureau of Mines report that their records show that prior to January 1, 1912, there were but three men in the State who were trained and who had received certificates in Mine Rescue work. Two of these men were from the Rockwood mines and assisted in this work at the Briceville explosion during the previous December.

While, without doubt, there were other men in the State holding such certificates that had been issued elsewhere, this is the number of which we have a record.

Past experience demonstrates that most of such men are ready at any time to volunteer in case of emergency. The fact of having a goodly number of our best miners trained in this work would be of inestimable advantage at such times. It is difficult, without previous organization, to get the best results. Much good could be accomplished if arrangements could be made to perfect these organizations, so that the men would be familiar and in readiness for this work.

While the Bureau of Mines has been of great assistance in giving this training, the matter of organization in Tennessee is one in which we must take the initiative.

BRIEF STATISTICS, 1912

The following statement gives brief statistics of all operations in Tennessee engaged in the production of coal and other mineral substances, or the reduction of mineral products in 1912:

Brief statistics, 1912.

PRODUCT	Quantity of Product	Value of Product	Total Number of Employees	Average Wages Paid Per Day	Total Amount Paid for Labor
Barytes (short tons).....	1,310	\$ 1,752	20	\$ 1.03	\$ 1,488
Bauxite (long tons).....	8,806	35,224	60	1.50	19,500
Brick and tile.....		1,251,380	1,776	1.43	528,058
Cement (bbls).....	1,419,237	820,920	485	2.00	307,443
Clay (short tons).....	55,594	123,062	215	1.46	77,028
Coal (short tons).....	6,578,754	7,422,703	10,185	2.31	5,084,023
Coke (short tons).....	371,086	905,503	464	1.40	198,468
Copper (pounds).....	18,133,173	2,846,550	707	2.17	450,603
Gas, Gas-coke, Tar and Ammonia.....		970,155	364	2.10	273,126
Gold (fine ounces).....	400	7,996	a	a	a
Iron ore (long tons).....	415,897	567,937	1,193	1.56	406,146
Iron, pig (long tons).....	338,225	4,348,405	1,213	1.42	450,437
Lime (short tons).....	95,690	303,438	424	1.36	109,505
Limestone (short tons).....	962,109	491,290	920	1.52	280,455
Marble (cubic feet).....	685,186	1,022,132	1,070	1.47	402,292
Mineral Paints (short tons).....	1,100	9,350	24	2.00	6,875
Mineral Waters (gallons sold).....	901,697	91,274			
Phosphate rock (long tons).....	443,065	1,542,988	1,508	1.51	583,493
Pottery.....		200,130	218	1.44	74,733
Quartz, crystalline, (short tons).....	55,175	29,792	29	1.76	15,734
Sand and Gravel (cubic yards, 2,500 lbs.).....	716,936	450,161	292	1.60	109,832
Sandstone (short tons).....	3,125	8,750	8	1.50	1,000
Silver (fine ounces).....	89,893	54,905	a	a	a
Sulphuric acid (short tons).....	291,251	1,513,651	a	a	a
Zinc (pounds).....	4,552,000	245,800	232	1.99	114,213
Total.....		\$ 25,265,278	21,407	\$ 1.92	\$ 9,494,452

a—Included in copper statistics.

It will be noted from the above that coal, both as to value of product, and as to employment of labor, easily occupies first place in the mineral operations of the state. The value of coal produced being 29.38 per cent of the total values of all mineral products; the number of men employed in coal production being 47.58 per cent of total men employed, while the amount paid for labor in coal is 53.55 per cent of the total amount paid for labor in all mineral operations.

Iron occupies second place as to value of product, the per cent of value of iron in relation to total value of mineral products being 19.46 per cent. The amount paid for labor in the production of iron, including that of producing the iron ore being 9.02 per cent of the total paid for labor in all mineral productions.

There are some duplications in the above in regard to totals of value that should be considered. This duplication of value affects totals only and not the value of any individual products, nor the number of employees, nor amounts paid same.

Pig iron is manufactured from iron ore, coke and limestone; the values of such of these products as are used in its manufacture have already been given under their respective headings, or were brought from other states, form a part also in the value of the pig iron.

The clay mined in Tennessee to be sold to commercial operators is principally consumed in other states; a certain amount is, however, sold in this state and manufactured into brick, tile, pottery, or other clay products, and the value of the clay thus sold is also considered in the value of clay products.

The value of the coke produced also includes the value of the coal from which it is manufactured.

The value of copper includes that of the coke, limestone, crystalline quartz, and other minerals used in its reduction.

And the value of gas, gashouse coke, tar and ammonia, includes the value of the coal and oil, and other minerals, from which it is manufactured.

Therefore, the value of the following products, which have been already considered, or have been shipped in from other states, should be deducted from the total value of minerals produced in the state:

Value of clay sold to Tennessee manufacturers.....	\$	504	
Value of coal manufactured into coke.....		727,152	
Value of coal and all other minerals used in the manufacture of gas, gas-coke, tar and ammonia.....		249,236	
Value of coke, limestone, quartz, etc., used in the reduction of copper.....		229,275	
Used in the manufacture of pig iron:			
Coke	\$1,231,598		
Iron ore	1,437,654		
Limestone (flux)	140,315		
Other minerals	15,785—	2,825,352	
Total deductions for all mineral products duplicated.....	\$	4,031,519	
Total value of mineral products as shown in general table.....		25,265,278	
Total net value mineral products after deducting duplication of values...	\$	21,233,759	

FINANCIAL STATEMENT.

The following statement gives the revenues accruing to the State, under the provisions of the mining laws, and also total of all disbursements during 1912:

Total amount accruing to state on account of mine inspections.....	\$	9,985
Total amount accruing to state on account of mine foreman examinations.....		350
		\$ 10,335

Total disbursements from January 1, 1912, to December 31, 1912, inclusive.

ACCOUNTS.	MONTHS AND AMOUNTS												
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Gr. Total
Salaries:													
Chief Mine Inspector.....	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 200.00	\$ 2,400.00
Dist. Inspector, East. Division.....	141.66	141.66	141.66	141.66	141.66	141.66	141.66	141.66	141.66	141.66	141.66	141.66	1,699.92
Dist. Inspector, Middle Division.....	141.66	141.66	141.66	141.66	141.66	141.66	141.66	141.66	141.66	141.66	141.66	141.66	1,699.92
District Inspector and Statistician.....	191.66	191.66	191.66	191.66	191.66	191.66	191.66	191.66	191.66	191.66	191.66	191.66	2,299.92
Clerk.....	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	1,800.00
Stenographer.....	83.33	83.33	83.33	83.33	83.33	83.33	83.33	83.33	83.33	83.33	83.33	83.33	999.96
Traveling Expenses:													
Chief Mine Inspector.....	42.40	35.36	43.95	29.75	52.75	92.55	66.71	67.30	81.67	35.45	59.30	53.90	661.09
District Inspector, Eastern Division.....	48.10	46.35	46.45	30.74	58.70	47.40	32.50	46.35	79.62	22.35	2.50	34.68	495.69
District Inspector, Middle Division.....	46.37	14.75	40.31	26.70	37.20	24.29	33.69	35.30	33.44	27.20	21.67	51.31	392.23
District Inspector and Statistician.....					10.50	2.00						20.20	32.70
Office Expenses, Stationery, Blanks, etc.....	76.70	19.30	23.45	39.95	7.10	159.10	14.25	43.10	7.30	41.45	9.15	177.00	617.85
Postage.....	.75	15.50	.50	.50		121.00	.25	.50	.50	.40	.25	75.50	215.65
Mine Inspectors' Supplies.....	36.97	3.65	5.70	5.15	4.65	3.89	7.50	12.32	1.55	5.90	1.35	2.05	90.68
Furniture and Fixtures.....				294.00									294.00
Mine Foreman Examinations.....						17.60							17.60
Printing.....													
Total.....	\$ 1,159.60	\$ 1,043.22	\$ 1,068.67	\$ 1,335.10	\$ 1,079.21	\$ 1,376.14	\$ 1,063.21	\$ 1,113.18	\$ 1,112.39	\$ 1,041.06	\$ 1,002.53	\$ 2,645.45	\$ 15,039.76

MINE INSPECTIONS IN 1912.

This table gives the mine inspections in detail in 1912, and the fees due the State by each operator as provided for by law.

OPERATOR		NAME OF MINE	MONTH AND DAY OF INSPECTION												No. of Inspectors	Av. No. Men	Fee for Inspection	Fee for Mine	Total Fee for Operation
NAME	Post Office		Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.					
ANDERSON COUNTY		Coal Creek	17	16				16			25			20	5	70	\$25	\$100	
		Black Diamond Coal Co.	18	19				17			24				4	88	30	120	\$ 220 00
		Black Diamond Coal Co.	16	22				28			30			12	5	49	21	80	
		Coal Creek Coal Co.													1	20	15	15	
		Coal Creek Coal Co.	15	23				16							6	47	20	80	175 00
		Coal Creek Coal Co.		22				22			29			11	6	47	20	80	175 00
		Thistle		21				21							4	48	20	80	
		Cross Mt. 1													2	40	20	49	120 00
		Knoxville Iron Co.	1					14							6	72	25	100	100 00
		Knoxville Iron Co.	12	20				15		26		24		19	2	36	20	20	20 00
		Pless								2					1	36	20	20	20 00
		Oliver Springs		20						27		24		18	6	77	30	120	120 00
		Piedmont Coal & Coke Co.	2	Tennessee				27		20					5	145	35	140	140 00
		Tennessee Coal Co.	26	26				12		16		18							
		Wind Rock Coal & Coke Co.																	
BLEDSOE COUNTY		Polk Creek Coal Co.	22		23								11		3	44	20	60	60 00
CAMPBELL COUNTY		Anchor Coal Co.																	
		Anchor		13											1	25	20	20	20 00
		Bear Wallow Coal & Coke Co.	22	16		30			19			15		17	6	42	20	80	80 00
		Big Block Coal Co.					21								1	11	10	10	10 00
		Block Coal & Coke Co.									5				1	6	5	5	
		Block Coal & Coke Co.													3	65	25	75	80 00
		Block Coal & Coke Co.		6				18			5				3	58	25	75	75 00
		Blue Gem Coal Co.		14				8							2	69	25	50	50 00
		Blue Gem Coal Co.													4	79	30	120	120 00
		Campbell Coal Mining Co.		8										6					
		Caryville Coal Co.		5				17		27					1	8	5	5	5 00
		Caryville Coal Co.		21											3	77	30	90	90 00
		Central Blue Gem Coal Co.													1	8	5	5	5 00
		Chaska Coal Co.		13				20			3				1	43	20	20	20 00
		Chaska																	
		Elk Valley Blue Gem Coal Co.		29											1	8	5	5	5 00
		Elk Valley Jellico Coal Co.		29											1	43	20	20	20 00

Evans Coal Co.	Jellico.	Evans.	20	13	12	3	37	26	60	80 00
Falls Branch Coal Co.	Woodridge.	Falls Branch.	16	9	31	3	82	30	90	---
Falls Branch Coal Co.	Woodridge.	Powhatan.	16	31	---	2	43	20	40	130 00
Jellico Cannel Co.	Newcomb.	Jellico Cannel.	22	15	30	3	34	20	60	80 00
H. M. Jones Coal Co.	Jellico.	Jellico B. G.	20	14	13	3	83	30	90	90 00
Kimberley Mining & Mfg. Co.	Cupp.	Kimberley.	12	20	3	3	162	35	105	---
LaFollette Coal, Iron & Ry. Co.	LaFollette.	Gem.	29	24	2	5	204	35	140	---
LaFollette Coal, Iron & Ry. Co.	LaFollette.	Rex 1.	23	7	15	10	204	35	140	---
LaFollette Coal, Iron & Ry. Co.	LaFollette.	Rex 2.	24	7	14	23	13	1	8	5
Perkins Branch Blue Gem Coal Co.	Elk Valley.	Perkins Branch.	29	14	29	6	102	35	105	140 00
Proctor Coal Co.	Red Ash, Ky.	Indian Mt.	21	5	11	27	3	67	25	75 00
Red Ash Coal Co.	Caryville.	Red Ash.	11	25	23	3	86	30	90	90 00
Remy Coal Co.	Gatiff.	Remy.	12	21	3	3	35	20	60	60 00
Rich Mt. Coal & Coke Co.	Bennett.	Rich Mt.	6	18	5	16	23	20	80	80 00
Rock Springs Coal Co.	Turley.	Rock Springs.	19	14	19	22	3	163	35	105
Royal Coal & Coke Co.	Pless.	Cambria.	7	25	4	3	34	20	60	---
Southern Coal & Coke Co.	Gatiff.	Southern.	4	10	26	4	83	30	120	180 00
Sun Coal Co.	Caryville.	Pee Wee.	4	10	26	7	3	84	30	90
Sun Coal Co.	Caryville.	Sun.	26	8	3	8	3	96	30	90
Tenn.-Jellico Coal Co.	Anthrax.	Tenn.-Jellico.	8	26	4	2	102	35	70	---
Westbourne Coal Co.	Westbourne.	Westbourne.	15	9	26	3	24	15	45	135 00
Westbourne Coal Co.	White Oak.	White Oak.	15	9	26	3	11	10	10	80 00
Woodbridge Jellico Coal Co.	Woodbridge.	Marion-Anna.	15	23	---	2	49	20	40	40 00
Woodbridge Jellico Coal Co.	Woodridge.	Woodridge.	15	23	---	2	25	20	40	---
Wynn Coal Co.	Gatiff.	Wynn.	22	30	---	3	52	25	75	115 00
Zechni Coal Co.	Newcomb.	Italian B. G.	22	15	30	3	47	20	60	---
Zechni Coal Co.	Newcomb.	Zechni.	22	15	30	3	34	20	40	100 00
CLAIBORNE COUNTY										
Bryson Mt. Coal & Coke Co.	Hartauff.	Bryson Mt. 1.	6	1	23	3	92	30	90	90 00
Bryson Mt. Coal & Coke Co.	Hartauff.	Bryson Mt. 2.	6	30	---	3	320	35	105	---
Campbell Coal Mining Co.	Egan.	Buffalo.	27	4	7	1	39	25	25	---
Fork Ridge Coal & Coke Co.	Fork Ridge.	Fork Ridge 1-2.	8	2	25	1	16	15	15	145 00
Fork Ridge Coal & Coke Co.	Fork Ridge.	Fork Ridge 3.	8	1	1	1	32	20	20	20 00
Fork Ridge Coal & Coke Co.	Fork Ridge.	Fork Ridge 4.	8	1	1	2	64	25	50	50 00
High Cliff Coal Co.	Pruden.	High Cliff.	28	4	6	3	43	20	60	60 00
King Mt. Coal Co.	King Mt.	King Mt.	28	4	6	3	190	35	105	105 00
Mingo Coal & Coke Co.	Hartauff.	Mingo 5.	7	15	5	3	52	25	75	75 00
Pruden Coal & Coke Co.	Pruden.	Pruden.	7	1	24	3	43	20	60	60 00
Reliance Coal & Coke Co.	Hartauff.	Reliance 1-2.	7	1	24	3	159	35	105	105 00
Standard Jellico Coal Co.	Chairfield.	Standard.	28	5	7	2	39	20	40	---
Sterling Coal & Coke Co.	Manning.	Sterling 1-2.	9	30	23	2	39	20	40	---
Yellow Creek Coal Co.	Middlesboro, Ky.	Yellow Creek 2.	9	3	3	2	39	20	40	---

Mine inspections in 1912, in detail—continued.

OPERATOR		NAME OF MINE	MONTH AND DAY OF INSPECTION												No. of Inspections	Av. No. Men	Fee for Inspection	Fee for Mine	Total Fee for Operation																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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MARION COUNTY

Battle Creek Coal & Coke Co.	Orme	Battle Creek	25		8		25				14		4	152	35	140	140 00
New Etina Coal Co.	Whiteside	Drum Opening		20									1	5	5	5	
New Etina Coal Co.	Whiteside	Mill Creek		20									1	4	5	5	
New Etina Coal Co.	Whiteside	New Etina 1					1				22		3	32	20	60	
New Etina Coal Co.	Whiteside	New Etina 2		20			1						2	6	5	10	
New Etina Coal Co.	Whiteside	New Etina 3		20									1	4	5	5	
New Etina Coal Co.	Whiteside	New Etina 4		20									1	4	5	5	
New Etina Coal Co.	Whiteside	New Etina 5		20			1						2	16	15	30	
New Etina Coal Co.	Whiteside	New Etina 6		20									1	11	10	10	
New Etina Coal Co.	Whiteside	St. Anthony					1				22		2	22	15	30	160 00
Tenn. Coal, Iron & R. R. Co.	Whitwell	Whitwell 1	24		25								4	154	35	140	
Tenn. Coal, Iron & R. R. Co.	Whitwell	Whitwell 5	24		25						13		4	200	35	140	280 00
Tenn. Consolidated Coal Co.	Tracy City	Pryor Ridge 1			6		11				10		4	154	35	140	
Tenn. Consolidated Coal Co.	Tracy City	Pryor Ridge 2			6		11				10		4	36	20	80	
Tenn. Consolidated Coal Co.	Tracy City	Pryor Ridge 4									10		1	11	10	230 00	
MORGAN COUNTY																	
Baker Mining Co.	Coalfield	Baker 1	29		27			15			3	9	5	37	20	80	80 00
Big Brushy Coal Co.	Petros	Big Brushy 1-2		27		7			5		29		4	80	30	120	120 00
Big Mt. Coal Mining Co.	Oliver Springs	Big Mt.	30				13						2	14	10	20	20 00
Bottomlee & Fagan	Blue Gem	Hooper						10					1	2	5	5	5 00
Coalfield Coal Co.	Coalfield	Bowling 2	29		27			15			3	10	5	37	20	80	80 00
Eagle Coal Co.	Oliver Springs	Poplar Creek									9		1	6	5	5	5 00
Harriman Coal Co.	Harriman	Harriman						10					2	20	15	30	30 00
Jackson, R. H.	Coalfield	Jackson						9					1	3	5	5	5 00
Jackson Bros. Coal Co.	Oliver Springs	Jackson						23					1	10	10	10	10 00
Little Brushy Coal Co.	Petros	Little Brushy						9			31		3	41	20	60	60 00
Oliver Coal Co.	Oliver Springs	Oliver			25								1	15	15	15	15 00
Oliver Springs Coal & Clay Co.	Oliver Springs	Reed						11					1	13	10	10	10 00
Prudential Coal Co.	Oliver Springs	Prudential	25		25			13			16		5	48	20	80	80 00
State of Tennessee	Nashville	State Mines		28				8			30	26	5	401	35	140	140 00
Wiley Coal Co.	Oliver Springs	Mt. Carbon	30								9		2	13	10	20	20 00
OVERTON COUNTY																	
Brier Hill Collieries	Crawford	Brier Hill 1		7			19				25	5	4	49	20	80	
Brier Hill Collieries	Crawford	Brier Hill 2		7			19				25	5	4	23	15	60	140 00
East Fork Coal & Coke Co.	Okey City	Okey City		8				20			26		3	14	10	30	30 00
Lusk, J. C.	Okey City	Peacock		8				19			26	5	3	5	15	15	15 00
Overton Coal & Coke Co.	Davidson	Overton		8				19			26	5	4	42	20	80	80 00
RHEA COUNTY																	
Dayton Coal & Iron Co.	Dayton	Prospect		22							30	2	5	90	30	120	120 00
Durham Coal & Iron Co.	Chattanooga	Fox 1	18										1	8	5	5	
Durham Coal & Iron Co.	Chattanooga	Fox 2				2		7			19	23	4	45	20	80	85 00

MINING DEPARTMENT OF TENNESSEE.

Mine inspections in 1912 in detail—continued.

OPERATOR		NAME OF MINE	MONTH AND DAY OF INSPECTION												No. of Inspections	Av. No. Men	Fee for Inspection	Fee for Mine	Total Fee for Operation	
			Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.						
ROANE COUNTY			Rockwood	McLean	22				7		19		16		7	5	34	20	80	
Roane Iron Co.	Rockwood	Rockwood Old	24								6		14			4	202	35	140	220 00
SCOTT COUNTY																				
Glen Mary Coal & Coke Co.	Glen Mary	Glen Mary A.				8				18			17			3	13	10	30	
Glen Mary Coal & Coke Co.	Glen Mary	Glen Mary C.				8				18			17			3	33	20	6	
Glen Mary Coal & Coke Co.	Glen Mary	Glen Mary G.				8				18			17			3	18	15	45	
Glen Mary Coal & Coke Co.	Glen Mary	Glen Mary O.								18			17			2	13	10	20	155 00
Pine Knot Coal Co.	Laxton	Pine Knot			27					16			14			3	22	15	45	45 00
Southern Clay Mfg. Co.	Chattanooga	Southern Clay			15								16			2	16	15	30	30 00
Stanley Coal Co.	Oneida	Stanley 1.			28					16			14			3	10	10	30	
Stanley Coal Co.	Oneida	Stanley 2.			28					16			14			3	12	10	30	
Stanley Coal Co.	Oneida	Stanley 3.								16			14			2	6	5	10	70 00
Terry Coal Co.	Oneida	Oneida			28					16			14			3	16	15	45	45 00
Virginia Mining Co.	Roberta	Phillips			26					17			15			3	26	20	60	
Virginia Mining Co.	Roberta	Rosser			26								15			2	20	15	30	
Virginia Mining Co.	Roberta	West Hollow			26					17						2	18	15	30	
Virginia Mining Co.	Roberta	Wilson											15			1	30	20	140 00	
Woods, R. A. & Co.	Oneida	Paint Rock 1.			27					16						2	13	10	2	
Woods, R. A. & Co.	Oneida	Paint Rock 3.			27											1	8	5	5	25 00
SEQUATCHIE COUNTY																				
Chattanooga Iron & Coal Co.	Chattanooga	Douglas 2.	23		24					23				12		4	166	35	140	140 00
WHITE COUNTY																				
Bon Air Coal & Iron Co.	Nashville	Bon Air Shaft.			19					9			9		17	4	75	30	120	
Bon Air Coal & Iron Co.	Nashville	Bon Air Six			19					9			9		17	4	30	20	80	
Bon Air Coal & Iron Co.	Nashville	Eastland 1.			20					10			10		18	4	66	25	100	
Bon Air Coal & Iron Co.	Nashville	Ravenscroft.			21					11			11		19	4	168	35	140	440 00
Clifty Consolidated Coal Co.	Clifty	Clifty Creek 1.			20					10			10		18	4	76	30	120	
Clifty Consolidated Coal Co.	Clifty	Clifty Creek 3.			20					10			10		18	4	111	35	140	260 00
																				\$9285 00
Total fees due the state from all coal mine inspections in 1912																				

Total fees due the state from all coal mine inspections in 1912.

\$9285 00

IRON ORE MINE INSPECTIONS, 1912

CAMPBELL COUNTY

LaFollette Iron Co.	LaFollette	No. 3 Slope							1	13	10	10	
LaFollette Iron Co.	LaFollette	Seneca							1	10	10	10	20 00

MEIGS COUNTY

Dayton Coal & Iron Co.	Dayton	Crescent							2	47	20	40	40 00
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ROANE COUNTY

Brown Mining Co.	Cardiff	Baker Slope							2	68	25	50	
Brown Mining Co.	Cardiff	Cardiff Slope							2	42	20	40	
Brown Mining Co.	Cardiff	Cardiff Slope							2	35	20	40	
Brown Mining Co.	Cardiff	Climer Slope							2	40	20	40	
Brown Mining Co.	Cardiff	Prospect Slope							2	15	15	30	
Brown Mining Co.	Cardiff	Wright Slope							2	35	20	40	240 00

Total fees due the state from all iron ore mine inspections in 1912.

\$ 300 00

COPPER MINE INSPECTIONS, 1912

POLK COUNTY

Ducktown Sulphur, Copper & Iron Co.	Isabella	East Tenn.							2	18	15	30	
Ducktown Sulphur, Copper & Iron Co.	Isabella	Mary							2	105	35	70	100 00
Tennessee Copper Co.	Copperhill	Burns Burns							2	185	35	70	
Tennessee Copper Co.	Copperhill	London							2	80	30	60	
Tennessee Copper Co.	Copperhill	Polk County							1	55	25	25	155 00

Total fees due the state from all copper mine inspections in 1912.

\$ 255 00

PHOSPHATE MINE INSPECTIONS, 1912.

LEWIS COUNTY

Charleston (S.C.) Mining & Mfg. Co.	Mt. Pleasant	Mayfield							1	175	35	35	35 00
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Total fees due the state from all phosphate mine inspections in 1912.

35 00

ZINC MINE INSPECTIONS, 1912.

JEFFERSON COUNTY

Grasselli Chemical Co. of Tenn.	New Market	Grasselli							2	25	20	40	40 00
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KNOX COUNTY

American Zinc Co. of Tenn.	Mascot	American Zinc							2	76	30	60	60 00
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Total fees due the state from all zinc mine inspections in 1912.

\$ 100 00

Grand total fees due the state from all mine inspections in 1912.

\$9985 00

COAL MINE OPERATORS, SUPERINTENDENTS, AND INSIDE FOREMEN IN TENNESSEE, JANUARY 1, 1913.

This table gives names and postoffice addresses of all coal mine operators, superintendents and inside foremen in Tennessee, January 1, 1913, with districts, counties, operators and name and location of mines, arranged alphabetically.

Names and postoffice addresses of coal mine operators, superintendents, and inside foremen in Tennessee, January 1, 1913.

No.	OPERATOR	No.	MINE	SUPT.	FOREMAN
	CO., NAME AND P.O.,		CO., NAME AND P.O.	CO., NAME AND P.O.	CO., NAME AND P.O.
	FIRST DISTRICT—BLEDSOE Co.		BLEDSOE Co.	BLEDSOE Co.	BLEDSOE Co.
1	Polk Creek Coal Co.	1	Atpontly	C. B. Finley	W. G. Lusk
	Atpontly		Atpontly	Chattanooga	Atpontly
	CUMBERLAND Co.		CUMBERLAND Co.	CUMBERLAND Co.	CUMBERLAND Co.
	Clear Creek Coal & Lumber Co.	2	Clear Creek 1	J. L. Barr	W. H. Reeves
2	Isoline		Isoline	Isoline	Isoline
	Clear Creek Coal & Lumber Co.	3	Clear Creek 5	J. L. Barr	W. H. Reeves
	Isoline		Isoline	Isoline	Isoline
3	Fall Creek Collieries	4	Fall Creek		Geo. Day
	Ozone		Ozone		Ozone
	FENTRESS Co.		FENTRESS Co.	FENTRESS Co.	FENTRESS Co.
4	Fentress Coal and Coke Co.	5	Wilder 1-2	U. K. Custred	E. W. Mansfield
	Philadelphia, Pa.		Wilder	Wilder	Wilder
5	Laurel Creek Coal Co.	6	Davidson		O. H. Jones
	Davidson		Davidson		Crawford
	GRUNDY Co.		GRUNDY Co.	GRUNDY Co.	GRUNDY Co.
6	Harrison, J. A.	7	Ferguson	J. A. Harrison	J. A. Harrison
	Tracy City		Coalmont	Tracy City	Tracy City
	Sewanee Fuel & Iron Co.	8	Clouse Hill		J. M. Sehorne
	Chattanooga		Coalmont		Coalmont
	Sewanee Fuel & Iron Co.	9	Coalmont A		J. M. Sehorne
7	Chattanooga		Coalmont		Coalmont
	Sewanee Fuel & Iron Co.	10	Coalmont B		J. M. Sehorne
	Chattanooga		Coalmont		Coalmont
	Sewanee Coal & Iron Co.	11	Coalmont L		J. M. Sehorne
	Chattanooga		Coalmont		Coalmont
	Tenn. Consolidated Coal Co.	12	East Fork	R. B. Roberts	W. C. Parsons
	Tracy City		Tracy City	Tracy City	Tracy City
	Tenn. Consolidated Coal Co.	13	Henley	R. B. Roberts	W. C. Parsons
8	Tracy City		Tracy City	Tracy City	Tracy City
	Tenn. Consolidated Coal Co.	14	Ramsey	R. B. Roberts	J. D. Wiley
	Tracy City		Tracy City	Tracy City	Tracy City
	Tenn. Consolidated Coal Co.	15	Reid Hill	R. B. Roberts	W. C. Parsons
	Tracy City		Tracy City	Tracy City	Tracy City
9	Workman, W. H.	16	Flat Branch	W. H. Workman	Geo. Barth
	Meeks		Meeks		Meeks
	MARION Co.		MARION Co.	MARION Co.	MARION Co.
10	Battle Creek Coal & Coke Co.	17	Battle Creek	W. G. Humphrey	F. P. Thompson
	Orme		Orme	Atlanta Ga.	Orme
	New Etna Coal Co.	18	Drum Opening	C. A. Hall	J. C. Foster
	Whiteside		Whiteside	Whiteside	Whiteside
	New Etna Coal Co.	19	Mill Creek	C. A. Hall	J. C. Foster
	Whiteside		Whiteside	Whiteside	Whiteside
	New Etna Coal Co.	20	New Etna 1	C. A. Hall	J. C. Foster
	Whiteside		Whiteside	Whiteside	Whiteside
	New Etna Coal Co.	21	New Etna 2	C. A. Hall	J. C. Foster
	Whiteside		Whiteside	Whiteside	Whiteside
	New Etna Coal Co.	22	New Etna 3	C. A. Hall	J. C. Foster
11	Whiteside		Whiteside	Whiteside	Whiteside
	New Etna Coal Co.	23	New Etna 4	C. A. Hall	J. C. Foster
	Whiteside		Whiteside	Whiteside	Whiteside
	New Etna Coal Co.	24	New Etna 5	C. A. Hall	J. C. Foster
	Whiteside		Whiteside	Whiteside	Whiteside

Names and postoffice addresses of coal mine operators, superintendents, and inside foremen in Tennessee, January 1, 1913—continued.

OPERATOR		MINE		SUPT.	FOREMAN
No.	CO., NAME AND P.O.	No.	CO., NAME AND P.O.	CO., NAME AND P.O.	CO., NAME AND P.O.
11	New Etna Coal Co.	25	New Etna 6	C. A. Hall	J. C. Foster
	Whiteside		Whiteside	Whiteside	Whiteside
12	New Etna Coal Co.	26	St. Anthony	C. A. Hall	J. C. Foster
	Whiteside		Whiteside	Whiteside	Whiteside
13	Tenn. Coal, Iron & R. R. Co.	27	Whitwell 1	W. A. Meagher	J. W. Smith
	Birmingham, Ala.		Whitwell	Whitwell	Whitwell
14	Tenn. Coal, Iron & R. R. Co.	28	Whitwell 5	W. A. Meagher	J. W. Smith
	Birmingham, Ala.		Whitwell	Whitwell	Whitwell
15	Tenn. Consolidated Coal Co.	29	Pryor Ridge 1	R. B. Roberts	S. L. Lowry
	Tracy City		Tracy City	Tracy City	Tracy City
16	Tenn. Consolidated Coal Co.	30	Pryor Ridge 2	R. B. Roberts	S. L. Lowry
	Tracy City		Tracy City	Tracy City	Tracy City
17	Tenn. Consolidated Coal Co.	31	Pryor Ridge 4	R. B. Roberts	S. L. Lowry
	Tracy City		Tracy City	Tracy City	Tracy City
OVERTON CO.		OVERTON CO.		OVERTON CO.	OVERTON CO.
18	Brier Hill Collieries	32	Brier Hill 1		R. F. Pope
	Crawford		Crawford		Crawford
19	Brier Hill Collieries	33	Brier Hill 2		R. F. Pope
	Crawford		Crawford		Crawford
20	East Fork Coal & Coke Co.	34	Obey City	S. A. Booher	J. C. Lusk
	Obey City		Obey City	Monterey	Monterey
21	Lusk, J. C.	35	Peacock	J. C. Lusk	J. C. Lusk
	Obey City		Monterey	Monterey	Monterey
22	Overton Coal & Coke Co.	36	Overton	Irving Allred	R. C. Blodaoe
	Davidson		Davidson	Allred	Davidson
SEQUATCHIE CO.		SEQUATCHIE CO.		SEQUATCHIE CO.	SEQUATCHIE CO.
23	Chattanooga Iron & Coal Co.	37	Douglas 2	J. M. Smith	Jno. Degnan
	Chattanooga		Dunlap	Dunlap	Dunlap
WHITE CO.		WHITE CO.		WHITE CO.	WHITE CO.
24	Bon Air Coal & Iron Co.	38	Bon Air Shaft	W. F. Dibrell	S. A. Rhinehart
	Nashville		Bon Air	Bon Air	Bon Air
25	Bon Air Coal & Iron Co.	39	Bon Air 6	W. F. Dibrell	David McKay
	Nashville		Bon Air	Bon Air	Bon Air
26	Bon Air Coal & Iron Co.	40	Eastland	W. F. Dibrell	Geo. Thom, Sr.
	Nashville		Eastland	Bon Air	Eastland
27	Bon Air Coal & Iron Co.	41	Ravenscroft	W. F. Dibrell	Geo. Thom, Jr.
	Nashville		Ravenscroft	Bon Air	Ravenscroft
28	Clifty Consolidated Coal Co.	42	Clifty Creek 1	C. W. Bell	Joe Ledford
	Clifty		Clifty	Clifty	Clifty
29	Clifty Consolidated Coal Co.	43	Clifty Creek 3	C. W. Bell	Joe Ledford
	Clifty		Clifty	Clifty	Clifty
SECOND DISTRICT		HAMILTON CO.		HAMILTON CO.	HAMILTON CO.
30	Alexander, T. A. & W. A.	44	Alexander	T. A. Alexander	
	Daisy		Daisy	Daisy	
31	Durham Coal & Iron Co.	45	Big Soddy 7	J. H. Jones	J. B. Mansfield
	Chattanooga		Soddy	Soddy	Soddy
32	Durham Coal & Iron Co.	46	Sale Creek	J. H. Jones	D. C. Parry
	Chattanooga		Sale Creek	Soddy	Sale Creek
33	Durham Coal & Iron Co.	47	Soddy 1-2	J. H. Jones	J. T. Olinger
	Chattanooga		Soddy	Soddy	Soddy
34	Durham Coal & Iron Co.	48	Soddy 4	J. H. Jones	Robert Joseph
	Chattanooga		Soddy	Soddy	Soddy
35	Montlake Coal Co.	49	Montlake	James Dagnan	Adam Millsaps
	Chattanooga		Montlake	Montlake	Montlake

Names and postoffice addresses of coal mine operators, superintendents, and inside foremen in Tennessee, January 1, 1913—continued.

No.	OPERATOR	No.	MINE	SUPT.	FOREMAN
	CO., NAME AND P.O.		CO., NAME AND P.O.		CO., NAME AND P.O.
	MORGAN Co.		MORGAN Co.	MORGAN Co.	MORGAN Co.
24	Baker Mining Co.	50	Baker 1.	W. G. Baker	M. F. Hatfield
	Coalfield.		Coalfield.	Coalfield.	Coalfield
25	Big Brushy Coal Co.	51	Big Brushy 1-2.	V. R. Evans	W. S. Scarbrough
	Petros.		Petros.	Petros.	Petros
28	Big Mt. Coal Mining Co.	52	Big Mountain.	Chas. Livingston.	Sam Price
	Oliver Springs.		Oliver Springs.	Oliver Springs.	Oliver Springs
27	Bottomlee & Fagan.	53	Hooper.		J. A. Fagan
	Blue Gem.		Blue Gem.		Blue Gem
28	Butler, J. K.	54	Poplar Creek.	Jas. Williams.	Sam Craig
	Oliver Springs.		Oliver Springs.	Oliver Springs.	Oliver Springs
29	Coalfield Coal Co.	55	Bowling 2.	A. H. Bowling.	W. D. Watkins
	Coalfield.		Coalfield.	Coalfield.	Coalfield
30	Fairchild, W. G.	56	Fairchild.		
	Sunbright.		Sunbright.		
31	Harriman Coal Co.	57	Gracy Ridge.	Geo. Cain.	P. C. Cravens
	Harriman.		Harriman.	Harriman.	Harriman
32	Jackson, R. H.	58	Jackson.		
	Coalfield.		Coalfield.		
33	Jackson Bros. Coal Co.	59	Jackson.	Alex Jackson.	Alex Jackson
	Oliver Springs.		Oliver Springs.	Oliver Springs.	Oliver Springs
34	Little Brushy Coal Co.	60	Little Brushy.	J. C. Horton.	J. C. Horton
	Stephens.		Stephens.	Stephens.	Stephens
35	Oliver Coal Co.	61	Oliver.	W. D. Richards.	Jno. Walls
	Oliver Springs.		Oliver Springs.	Oliver Springs.	Oliver Springs
36	Oliver Springs Coal & Clay Co.	62	Reed.	W. G. Morrison.	Geo. Cagley
	Oliver Springs.		Oliver Springs.	Oliver Springs.	Oliver Springs
37	Prudential Coal Co.	63	Prudential.	L. O. Stone.	R. L. Davis
	Knoxville.		Oliver Springs.	Oliver Springs.	Oliver Springs
38	State of Tennessee.	64	State Mines.	A. W. Evans.	S. H. Jester
	Nashville.		Petros.	Petros.	Petros
39	Wiley Coal Co.	65	Mt. Carbon.	E. F. Wiley.	Andrew Walls
	Oliver Springs.		Oliver Springs.	Knoxville.	Oliver Springs
	RHBA Co.		RHBA Co.	RHBA Co.	RHBA Co.
40	Dayton Coal & Iron Co.	66	Prospect.	J. T. Stansbury.	J. C. Pressnell
	Dayton.		Dayton.	Dayton.	Dayton
41	Durham Coal & Iron Co.	67	Fox 2.	J. H. Jones.	S. P. Loggins
	Chattanooga.		Graysville.	Soddy.	Graysville
42	Penn. Coal & Lumber Corp.	68	Penn.	G. P. Fitchette.	J. C. Dodson
	Spring City.		Spring City.	Spring City.	Spring City
	ROANE Co.		ROANE Co.	ROANE Co.	ROANE Co.
43	Roane Iron Co.	69	McLean.	W. J. Richards.	W. D. Kelly
	Rockwood.		Arbutus.	Rockwood.	Arbutus
	Roane Iron Co.	70	Rockwood Old.	W. J. Richards.	W. T. Richards
	Rockwood.		Rockwood.	Rockwood.	Rockwood
	SCOTT Co.		SCOTT Co.	SCOTT Co.	SCOTT Co.
44	Baker Coal & Coke Co.	71	Baker.		San Van
	Newland.		Newland.		Newland
	Glen Mary Coal & Coke Co.	72	Glen Mary A.	J. M. Carson.	J. M. Carson
	Glen Mary.		Glen Mary.	Glen Mary.	Glen Mary
	Glen Mary Coal & Coke Co.	73	Glen Mary C.	J. M. Carson.	J. M. Carson
	Glen Mary.		Glen Mary.	Glen Mary.	Glen Mary
45	Glen Mary Coal & Coke Co.	74	Glen Mary G.	J. M. Carson.	J. M. Carson
	Glen Mary.		Glen Mary.	Glen Mary.	Glen Mary
	Glen Mary Coal & Coke Co.	75	Glen Mary O.	J. M. Carson.	J. M. Carson
	Glen Mary.		Glen Mary.	Glen Mary.	Glen Mary
46	Pine Knot Coal Co.	76	Pine Knot.	A. McDonald.	Geo. Chambers
	Harriman.		Laxton.	Harriman.	Laxton
47	Southern Clay Mfg. Co.	77	Southern Clay.	J. A. Lansberry.	E. M. Lindsey
	Robbins.		Robbins.	Robbins.	Robbins

Names and postoffice addresses of coal mine operators, superintendents, and inside foremen in Tennessee, January 1, 1913—continued.

OPERATOR		MINE		SUPT.	FOREMAN
No.	CO., NAME AND P.O.	No.	CO., NAME AND P.O.	CO., NAME AND P.O.	CO., NAME AND P.O.
SCOTT CO. CON.					
48	Stanley Coal Co.	78	Oneida	A. McDonald	Dewey Jeffers
	Harriman		Oneida	Harriman	Fogel
	Stanley Coal Co.	79	Stanley 1	A. McDonald	Dewey Jeffers
	Harriman		Oneida	Harriman	Fogel
49	Stanley Coal Co.	80	Stanley 2	A. McDonald	Dewey Jeffers
	Harriman		Oneida	Harriman	Fogel
	Stanley Coal Co.	81	Stanley 6	A. McDonald	Dewey Jeffers
	Harriman		Oneida	Harriman	Fogel
49	Va. Mining Co.	82	Phillips	Alfred Laxton	Wm. Buttram
	Roberta		Roberta	Roberta	Roberta
	Va. Mining Co.	83	Rosser	Alfred Laxton	Wm. Buttram
	Roberta		Roberta	Roberta	Roberta
50	Va. Mining Co.	84	West Hollow	Alfred Laxton	Wm. Buttram
	Roberta		Roberta	Roberta	Roberta
	Va. Mining Co.	85	Wilson	Alfred Laxton	Wm. Buttram
	Roberta		Roberta	Roberta	Roberta
50	Paint Rock Coal Co.	86	Paint Rock 1	A. McDonald	
	Harriman		Oneida	Harriman	
	Paint Rock Coal Co.	87	Paint Rock 2	A. McDonald	
	Harriman		Oneida	Harriman	
50	Paint Rock Coal Co.	88	Paint Rock 6	A. McDonald	
	Harriman		Oneida	Harriman	
THIRD DISTRICT					
ANDERSON Co.		ANDERSON Co.		ANDERSON Co.	
51	Black Diamond Coal Co.	89	Black Diamond 1	L. F. Card	W. E. Hendren
	Knoxville		Coal Creek	Coal Creek	Coal Creek
	Black Diamond Coal Co.	90	Black Diamond 5	L. F. Card	Jno. Sharp
	Knoxville		Coal Creek	Coal Creek	Coal Creek
52	Coal Creek Coal Co.	91	Fraterville	G. M. Camp	W. H. Branscom
	Knoxville		Coal Creek	Coal Creek	Coal Creek
	Coal Creek Coal Co.	92	Taft	G. M. Camp	W. H. Branscom
	Knoxville		Coal Creek	Coal Creek	Coal Creek
53	Coal Creek Coal Co.	93	Thistle	G. M. Camp	W. H. Branscom
	Knoxville		Coal Creek	Coal Creek	Coal Creek
	Knoxville Iron Co.	94	Cross Mt. 1	P. F. Lynch	Geo. Bulmer
	Knoxville		Briceville	Briceville	Briceville
54	Knoxville Iron Co.	95	Cross Mt. 3	P. F. Lynch	Jno. Jeffrey
	Knoxville		Briceville	Briceville	Briceville
	Piedmont Coal & Coke Co.	96	Piedmont	E. F. Buffat	G. B. Carden
	Oliver Springs		Oliver Springs	Oliver Springs	Oliver Springs
55	Minersville Coal Co.	97	Brookside	J. W. Goans	J. M. Stonecipher
	Pless		Pless	Pless	# Pless
	Minersville Coal Co.	98	Buck Mt.	J. W. Goans	J. M. Stonecipher
	Pless		Pless	Pless	Pless
56	Tennessee Coal Co.	99	Middle Ridge	H. R. Smith	Chas. Probert
	Knoxville		Briceville	Briceville	Briceville
	Tennessee Coal Co.	100	Tennessee	H. R. Smith	E. M. Taylor
	Knoxville		Briceville	Briceville	Briceville
57	Wind Rock Coal & Coke Co.	101	Wind Rock	W. C. Hutcheson	T. M. Doyle
	Wind Rock		Wind Rock	Wind Rock	Wind Rock
	CAMPBELL Co.		CAMPBELL Co.	CAMPBELL Co.	CAMPBELL Co.
	Baird, Lewis	102	Baird, B. G.	Lewis Baird	Aaron Baird
58	Elk Valley		Elk Valley	Elk Valley	Elk Valley
	Bear Wallow Coal & Coke Co.	103	Bear Wallow	Ed. Allen	J. W. Dixon
	Caryville		Caryville	Caryville	Caryville

Names and postoffice addresses of coal mine operators, superintendents, and inside foremen in Tennessee, January 1, 1913—continued.

OPERATOR		MINE		SUPT.	FOREMAN
No.	CO., NAME AND P.O.	No.	CO., NAME AND P.O.	CO., NAME AND P.O.	CO., NAME AND P.O.
60	CAMPBELL CO. CON. Block Coal & Coke Co.	104	Block 2	Jno. P. Gorman	M. K. Marlow
	Block		Block	Jellico	Block
	Block Coal & Coke Co.	105	Block 3	Jno. P. Gorman	M. K. Marlow
	Block		Block	Jellico	Block
61	Blue Gem Coal Co.	106	Blue Gem	J. F. McPherson	C. M. Woodward
62	Jellico		Jellico	Jellico	Jellico
62	Broyles, Squire	107	Central, B. G.	Squire Broyles	Squire Broyles
	Jellico		Jellico	Jellico	Jellico
63	Campbell Coal Mining Co.	108	Jackson	Joseph Richards	Joe Rigby
64	Westbourne		Westbourne	Westbourne	Westbourne
	Caryville Coal Co.	109	Caryville	H. E. Taylor	J. W. Duncan
65	Caryville		Caryville	Caryville	Caryville
	Chaska Coal Co.	110	Chaska	W. M. Sexton	W. M. Comer
65	Knoxville		Chaska	Chaska	Chaska
	Elk Valley Jellico Coal Co.	111	Elk Valley	D. W. Parrott	Wm. Hammons
67	Elk Valley		Elk Valley	Elk Valley	Elk Valley
	Evans Coal Co.	112	Evans	J. L. Slusher	Jno. Kasee
67	Jellico		Jellico	Jellico	Jellico
	Falls Branch Coal Co.	113	Falls Branch	Wm. Dinkelaker	J. W. Howe
68	Woodridge		Woodridge	Woodridge	Woodridge
	Falls Branch Coal Co.	114	Powhatan	Wm. Dinkelaker	J. W. Howe
68	Woodridge		Woodridge	Woodridge	Woodridge
	Jellico Cannel Co.	115	Jellico Cannel	W. G. Miller	Wm. Buck
70	Massillon, Ohio		Newcomb	Newcomb	Newcomb
	H. M. Jones Coal Co.	116	Jameson, B. G.	H. M. Jones	Alex Ross
71	Jellico		Jellico	Jellico	Jellico
	Kimberly Mining & Mfg. Co.	117	Kimberly	C. R. Brooks	A. N. Parris
71	Knoxville		Cupp	Cupp	Cupp
	La Follette Coal, Iron & Ry. Co.	118	Gem	W. S. Wilson	H. V. Stone
72	La Follette		Peabody	Peabody	Peabody
	La Follette Coal, Iron & Ry. Co.	119	Rex 1	H. Bivan	J. A. Gains
72	La Follette		La Follette	La Follette	La Follette
	La Follette Coal, Iron & Ry. Co.	120	Rex 2	Chas. Hoeble	C. D. Rosser
73	La Follette		La Follette	La Follette	La Follette
	Perkins Branch B. G. Coal Co.	121	Perkins Branch	E. Baird	E. Baird
74	Elk Valley		Elk Valley	Elk Valley	Elk Valley
	Proctor Coal Co.	122	Indian Mt.	Phil Francis	J. P. Alred
75	Red Ash, Ky.		Jellico	Jellico	Red Ash, Ky.
	Red Ash Coal Co.	123	Red Ash	T. D. Richards	D. W. Steadman
76	Caryville		Caryville	Caryville	Caryville
	Remy Coal Co.	124	Remy	A. J. Queener	P. T. Neely
77	Gatdiff		Gatdiff	Gatdiff	Gatdiff
	Rich Mt. Coal & Coke Co.	125	Rich Mt.	H. W. Tillery	M. S. Elliott
78	Coal Creek		Bennett	Bennett	Bennett
	Rock Springs Coal Co.	126	Rock Springs	G. W. Card	P. F. Card
79	Turley		Turley	Turley	Turley
	Royal Coal & Coke Co.	127	Cambria	W. A. Pless	Chas. Bell
79	Pless		Pless	Coal Creek	Coal Creek
	Royal Coal & Coke Co.	128	New Royal	W. A. Pless	Chas. Bell
80	Pless		Pless	Coal Creek	Coal Creek
	Southern Coal & Coke Co.	129	Southern	A. V. Brown	G. W. Pickle
81	Gatdiff		Gatdiff	Gatdiff	Gatdiff
	Sun Coal Co.	130	Pee Wee	J. H. Bowling	Warren Card
81	Caryville		Caryville	Caryville	Caryville
	Sun Coal Co.	131	Sun	J. H. Bowling	Warren Card
81	Caryville		Caryville	Caryville	Caryville

Names and postoffice addresses of coal mine operators, superintendents, and inside foremen in Tennessee, January 1, 1913—continued.

OPERATOR		MINE		SUPT.	FOREMAN
No.	CO., NAME AND P.O.	No.	CO., NAME AND P.O.	CO., NAME AND P.O.	CO., NAME AND P.O.
CAMPBELL CO. CON.					
82	Tenn.-Jellico Coal Co.	132	Tenn.-Jellico	Jno. P. Gorman	P. F. Gorman, Jr.
	Knoxville		Anthras	Jellico	Anthras
	Westbourne Coal Co.	133	Westbourne	Joseph Richards	R. T. Boone
83	Westbourne		Westbourne	Westbourne	Westbourne
	Westbourne Coal Co.	134	White Oak	Joseph Richards	R. T. Boone
	Westbourne		Westbourne	Westbourne	Westbourne
	Woodridge Jellico Coal Co.	135	Marion-Anna	Wm. Dinkelaker	T. H. Griffith
84	Woodridge		Woodridge	Woodridge	Woodridge
	Woodridge Jellico Coal Co.	136	Woodridge	Wm. Dinkelaker	T. H. Griffith
	Woodridge		Woodridge	Woodridge	Woodridge
85	Wynn Coal Co.	137	Wynn	J. H. Wynn	J. H. Wynn
	Gatliff		Gatliff	Gatliff	Gatliff
86	United Mining Co.	138	Big Block	S. M. Cooper	J. W. Haywood
	Knoxville		Gatliff	Gatliff	Jellico
87	Italian Blue Gem Coal Co.	139	Italian, B. G.	Thomas Zechini	Joe Graef
	Newcomb		Newcomb	Newcomb	Newcomb
88	Zechini Coal Co.	140	Zechini	Thomas Zechini	Joe Graef
	Newcomb		Newcomb	Newcomb	Newcomb
CLAIBORNE CO.					
	Bryson Mt. Coal & Coke Co.	141	Bryson Mt. 1	A. L. Adam	Julius Brown
89	Bryson		Bryson	Bryson	Bryson
	Bryson Mt. Coal & Coke Co.	142	Bryson Mt. 2	A. L. Adam	Julius Brown
	Bryson		Bryson	Bryson	Bryson
90	Campbell Coal Mining Co.	143	Buffalo	J. H. Reynolds	Riley Parrott
	Eagan		Eagan	Eagan	Eagan
	Fork Ridge Coal & Coke Co.	144	Fork Ridge 1-2	A. H. Rennebaum	Jno. Lewis
	Fork Ridge		Fork Ridge	Middlesboro, Ky.	Fork Ridge
91	Fork Ridge Coal & Coke Co.	145	Fork Ridge 3	A. H. Rennebaum	Jno. Lewis
	Fork Ridge		Fork Ridge	Middlesboro, Ky.	Fork Ridge
	Fork Ridge Coal & Coke Co.	146	Fork Ridge 4	A. H. Rennebaum	Jno. Lewis
	Fork Ridge		Fork Ridge	Middlesboro, Ky.	Fork Ridge
	Appalachian Washed Coal Co.	147	Nicholson 2	E. R. Short	Lum Koontz
92	Fork Ridge		Fork Ridge	Fork Ridge	Fork Ridge
	Appalachian Washed Coal Co.	148	Nicholson 3	E. R. Short	Lum Koontz
	Fork Ridge		Fork Ridge	Fork Ridge	Fork Ridge
93	High Cliff Coal Co.	149	High Cliff	James Carmack	Jos. Rigby
	Pruden		Pruden	Pruden	Pruden
94	King Mt. Coal Co.	150	King Mt.	A. J. Herron	W. P. Lansden
	Clairfield		Clairfield	Clairfield	Clairfield
95	Mingo Coal & Coke Co.	151	Mingo 5	Z. T. Ralston	A. H. Davidson
	Hartranft		Hartranft	Hartranft	Hartranft
96	Pruden Coal & Coke Co.	152	Pruden	C. A. Griffith	R. C. Speakes
	Pruden		Pruden	Pruden	Pruden
	Reliance Coal & Coke Co.	153	Reliance 1-2	D. C. Swab	Geo. Bell
97	Hartranft		Hartranft	Hartranft	Hartranft
	Reliance Coal & Coke Co.	154	Reliance 3	D. C. Swab	Geo. Bell
	Hartranft		Hartranft	Hartranft	Hartranft
98	Standard Jellico Coal Co.	155	Standard	L. R. Eager	A. S. Lindsey
	Clairfield		Clairfield	Clairfield	Clairfield
99	Sterling Coal & Coke Co.	156	Sterling 1-2	C. B. Finley, Jr.	W. T. Robinson
	Manring		Manring	Manring	Manring
	Yellow Creek Coal Co.	157	Yellow Creek 2 .....	.....	.....
100	Middlesboro, Ky.		Middlesboro .....	.....	.....
	Yellow Creek Coal Co.	158	Yellow Creek 3 .....	.....	.....
	Middlesboro, Ky.		Middlesboro .....	.....	.....

The following mines shown in the 1911 report are now combined, or changed in name, and are now reported as follows:

Name of Mine as shown in report of 1911	No.	Name and number under which mine is now reported	
COUNTY AND NAME		COUNTY AND NAME	POST OFFICE
WHITE COUNTY		WHITE COUNTY	
Eastland 1 } Eastland 2 } -----	40	Eastland	Eastland
MORGAN COUNTY		MORGAN COUNTY	
Harriman	57	Gracy Ridge	Harriman
ANDERSON COUNTY		ANDERSON COUNTY	
Piedmont 2 } Piedmont 4 } -----	96	Piedmont	Oliver Springs
CAMPBELL COUNTY		CAMPBELL COUNTY	
Woodward	107	Central B. G.	Jellico
Jellico B. G.	116	Jameson B. G.	Jellico

The following mines shown in the 1911 report are now worked out and abandoned, or closed indefinitely.

Name of operator, and name of mine and post office address.

COUNTY AND OPERATOR	NAME	Post Office
RHEA COUNTY		
Durham Coal & Iron Co.	Fox 1	Graysville
SCOTT COUNTY		
George Coffee	Coffee	Laxton
LeMoyné	LeMoyné	Isham
ANDERSON COUNTY		
Briceville Coal Co.	Andy's Ridge	Briceville
CAMPBELL COUNTY		
Anchor Coal Co.	Anchor	Morley
Davis Creek Coal Co.	Davis Creek	Cupp
Morley Coal Co.	Morley	Morley
I. L. Wilson	Newcomb B. G.	Newcomb

COAL SEAMS.

This table gives the name, thickness, and analysis of each coal seam worked in Tennessee in 1912, together with the names of the operating companies.

Name, thickness, elevation and analysis of coal seams worked in Tennessee in 1912, and the coal production of each mine.

OPERATOR		SEAM WORKED			ANALYSIS				
COUNTY AND MINE	Product 1912 Short Tons	NAME	Elevation above Sea Level (feet)	Thickness (Inches)	Fixed Carbon (Per Cent.)	Volatile Matter (Per Cent.)	Ash (Per Cent.)	Moisture (Per Cent.)	Sulphur (Per Cent.)
ANDERSON COUNTY									
Black Diamond Coal Co.	105,722	Coal Creek	1,025	44	63.15	29.78	2.65	2.35	0.19
Coal Creek Coal Co.	76,869	Coal Creek	961	48	57.29	36.65	5.50	0.56	1.03
{ Frater Mine		Coal Creek	990	72	57.29	36.65	5.50	0.56	1.03
{ Taft Mine		Coal Creek	1,011	48	55.55	40.00	3.10	1.35	0.63
{ Thistle Mine		Coal Creek	1,006	46	55.55	40.00	3.01	1.35	0.63
Knoxville Iron Co.	65,248	Coal Creek	1,006	46	55.55	40.00	3.01	1.35	0.63
Piedmont Coal and Coke Co.	17,210	Coal Creek	1,000	46	54.06	41.73	3.15	1.06	
Minersville Coal Co.	63,955	Coal Creek	1,000	50	60.17	35.54	2.40	1.29	0.60
Tenn. Coal Co.	78,848	Coal Creek	975	48	63.42	31.47	3.34	1.34	0.43
Windrock Coal & Coke Co.	150,382	Dean	2,400	56	56.77	37.70	4.23	1.30	1.20
BLEDSOE COUNTY									
Polk Creek Coal Co.	17,268	Sewanee	1,500	36	63.57	28.17	7.10	1.16	1.15
CAMPBELL COUNTY									
Anchor Coal Co.	18,000	White Oak 1-2	1,373	72					
Bear Wallow Coal & Coke Co.	23,436	Coal Creek	1,050	38	58.09	38.82	1.60	1.49	0.60
Block Coal & Coke Co.	62,400	Monarch	2,700	68	50.77	46.53	1.43	1.27	
Blue Gem Coal Co.	37,200	Blue Gem	1,000	24	51.27	44.79	1.24	2.70	0.90
Campbell Coal Mining Co.	67,232	Log Mountain	1,100	48					
Caryville Coal Co.	49,870	Block	2,445	42	60.87	35.29	1.68	1.55	0.61
Central Blue Gem Coal Co.	3,000	Blue Gem	1,200	24					
Chaska Coal Co.	50,654	Rich Mountain	1,400	40	54.40	37.14	6.45	2.07	2.67
Lewis Baird	1,652	Blue Gem	1,250	20	59.05	39.01	1.40	2.16	0.69
Elk Valley Jellico Coal Co.	13,992	Jellico	1,600	36					
Evans Coal Co.	14,400	Blue Gem	1,000	24					
Falls Branch Coal Co.	85,361	Jellico	1,250	40	60.60	35.44	1.60	2.36	
{ Falls Branch Mine		Blue Gem	1,160	24					
{ Powhatan Mine		Cannel	2,600	33	32.63	52.56	13.57	1.24	1.56
Jellico Cannel Co.	11,550	Cannel	2,600	33	32.63	52.56	13.57	1.24	1.56
Jones, H. M. Coal Co.	15,000	Blue Gem	1,200	24	55.71	40.54	1.09	2.65	
Kimberly Mining & Mfg. Co.	57,513	Rich Mountain	1,550	38					
La Follette Coal Iron & Ry. Co.	425,652	Jordan	1,986	50	56.25	41.36	1.72	0.67	0.65
{ Gem Mine		Rex	1,180	40	56.28	40.26	3.46	2.50	1.21
{ Rex No. 1 Mine		Rex	1,270	36	56.28	40.26	3.46	2.50	1.21
{ Rex No. 2 Mine		Blue Gem		20					
Perkins Branch Blue Gem Coal Co.	1,956	Blue Gem		20					
Proctor Coal Co.	72,643	Jellico	1,300	40	58.25	38.50	1.45	1.80	
Red Ash Coal Co.	77,243	Red Ash	2,450	42	28.52	37.72	1.74	2.02	
Remy Coal Co.	43,171	Rich Mountain	1,578	36	54.24	42.64	1.42	1.70	0.65
Rich Mountain Coal & Coke Co.	54,000	Rich Mountain	1,270	34	53.47	40.84	4.99	0.70	1.97
Rock Springs Coal Co.	42,000	Dean	2,600	50					
Royal Coal & Coke Co.	29,896	Coal Creek	1,136	42	60.17	35.54	2.40	1.29	0.60
{ Cambria Mine		Coal Creek	1,136	50					
{ New Royal Mine									

Name, thickness, elevation and analysis of coal seams worked in Tennessee in 1912, and the coal production of each mine.—continued.

OPERATOR	Product 1912 Short Tons	SEAM WORKED			ANALYSIS				
COUNTY AND MINE		NAME	Elevation above Sea Level (feet)	Thickness (Inches)	Fixed Carbon (Per Cent.)	Volatile Matter (Per Cent.)	Ash (Per Cent.)	Moisture (Per Cent.)	Sulphur (Per Cent.)
CAMPBELL COUNTY, CON.									
Southern Coal and Coke Co.....	120,679	Jordan.....	2,250	53	59.25	36.32	2.13	2.30	1.07
Sun Coal Co.....	85,160	Block.....	2,429	42					
Tenn.-Jellico Coal Co.....	55,725	Jellico.....	1,400	62	61.00	34.00	3.00	2.00	
Westbourne Coal Co.....	148,865	Log Mountain.....	1,100	43	56.25	41.36	1.72	0.67	0.78
Woodridge Jellico Coal Co.....									
{ Marion-Anna Mine.....	59,116	Jellico.....	1,225	36	60.60	35.44	1.60	2.36	
{ Woodridge Mine.....		Jellico.....	1,200	42	60.60	35.44	1.60	2.36	
Wynn Coal Co.....	42,971	Rich Mountain.....	1,400	36	53.15	41.71	2.75	2.39	0.73
Zechini Coal Co.....	36,450	Blue Gem.....	1,200	22					
United Mining Co.....	626			30					
CLAIBORNE COUNTY									
Bryson Mountain Coal & Coke Co.....	116,013	Mingo.....	1,755	60	60.87	34.63	2.43	1.63	0.44
Campbell Coal Mining Co.....	78,697	Remy.....	1,425	36	55.66	40.82	1.72	1.80	0.56
Fork Ridge Coal & Coke Co.....									
{ Fork Ridge 1 & 2.....	369,267	Mingo.....	1,700	54	59.83	37.19	1.40	0.88	0.70
{ Fork Ridge 3.....		Sterling.....	2,300	52	55.96	40.07	2.33	1.14	0.50
King Mountain Coal Co.....	33,410	Jellico.....	1,256	41	58.30	38.93	1.25	1.52	0.71
Mingo Coal & Coke Co.....	57,779	Mingo.....	2,250	52					
Appalachian Washed Coal Co.....	3,642	Nicholson.....	1,800	60	57.56	36.61	3.97	1.86	
Pruden Coal & Coke Co.....	220,000	Mingo.....	1,700	60	57.98	38.82	1.60	1.60	0.72
Reliance Coal & Coke Co.....	60,000	Mingo.....	1,600	60	57.95	40.40	1.35	0.30	
Standard Jellico Coal Co.....	28,274	Jellico.....	1,240	38	63.43	31.80	1.70	0.83	2.24
Sterling Coal & Coke Co.....	227,228	Sterling.....	2,300	60	60.00	34.00	4.00	2.00	0.75
Yellow Creek Coal Co.....									
{ Yellow Creek Mine 2.....	59,120	Jack Rock.....	1,600	36	60.51	34.50	4.99	1.50	0.50
{ Yellow Creek Mine 3.....		Poplar Lick.....	2,000	54	60.51	34.50	4.99	1.50	0.72
Highcliff Coal Co.....	5,780	Mingo.....	1,800	60					
CUMBERLAND COUNTY									
Clear Creek Coal & Lumber Co.....	23,563	Isoline.....	1,900	33	53.86	42.20	2.21	1.73	1.47
Fall Creek Collieries.....	12,602	Sewanee.....		54					
FENTRESS COUNTY									
Fentress Coal & Coke Co.....	101,911	Bon Air 2.....	1,600	54	52.73	34.73	9.08	3.46	2.42
Laurel Creek Coal Co.....	561	Bon Air 2.....	1,648	48					
GRUNDY COUNTY									
Ferguson and Harrison.....	2,845	Sewanee.....	1,900	41	59.83	31.32	6.65	1.30	0.85
Sewanee Fuel & Iron Co.....	137,652	Sewanee.....	1,916	40	59.88	31.32	7.50	1.30	0.85
Tenn. Consolidated Coal Co.....									
{ East Fork Mine.....	132,113	Sewanee.....	1,900	42					
{ Henley Mine.....		Sewanee.....	1,935	36					
{ Ramsey Mine.....		Sewanee.....	1,860	42	57.73	32.66	8.35	1.26	0.64
{ Reid Hill Mine.....		Sewanee.....	1,919	42	56.82	32.73	9.43	1.02	0.76
Flat Branch Coal Co.....	10,255	Sewanee.....	1,900	34					
HAMILTON COUNTY									
Alexander, T. A. & W. A.....	2,388	No. 10.....	1,625	40					
Durham Coal & Iron Co.....									
{ Big Soddy No. 7 Mine.....	326,537	Soddy No. 7.....	1,200	32	65.45	26.04	7.48	1.02	0.64
{ Sale Creek Mine.....		Nelson No. 2.....	875	42	60.29	31.27	7.02	1.42	0.60
{ Soddy 1 & 2 Mine.....		Soddy No. 7.....	2,168	27	60.85	29.18	7.16	2.10	0.71
{ Soddy 4 Mine.....		Soddy No. 7.....	1,440	32	60.85	29.18	7.16	2.10	0.71
Montlake Coal Co.....	54,362	No. 10.....	2,125	42	61.34	28.33	8.75	0.64	1.27

Name, thickness, elevation and analysis of coal seams worked in Tennessee in 1912, and the coal production of each mine.—continued.

OPERATOR	SEAM WORKED				ANALYSIS				
COUNTY AND MINE	Product 1912 Short Tons	NAME	Elevation above Sea Level (feet)	Thickness (Inches)	Fixed Carbon (Per Cent.)	Volatile Matter (Per Cent.)	Ash (Per Cent.)	Moisture (Per Cent.)	Sulphur (Per Cent.)
MARION COUNTY									
Battle Creek Coal & Coke Co.	104,100	Battle Creek	1,550	60	58.77	32.44	6.12	1.50	1.17
New Etna Coal Co.	35,647	Kelly	1,690	32	73.92	21.90	2.45	1.02	0.71
Tenn. Coal Iron & R. R. Co.	318,728	Sewanee	1,741	36	61.57	28.14	8.39	1.90	0.90
Tenn. Consolidated Coal Co.	191,618	Sewanee	1,841	48	70.23	21.18	7.43	1.16	0.79
New Etna Coal Co.	5,393	St. Anthony	650	30	63.70	25.45	10.39	0.46	2.47
MORGAN COUNTY									
Baker Mining Co.	20,000	Coal Creek	1,000	48	55.72	40.89	2.12	0.80	1.10
Big Brushy Coal Co.	33,862	Brushy Mountain	1,620	40	63.32	32.32	5.37		0.81
Big Mountain Coal Mining Co.	4,137	Coal Creek	2,000	48					
Bottomlee and Fagan	600	Blue Gem	1,000	26					
H. B. Bowling Coal Co.	32,174	Coal Creek	1,000	60	55.70	40.39	2.02	0.79	1.10
Harriman Coal Co.	6,682	Jellico	1,100	26	57.36	38.13	3.53		0.65
Jackson, R. H.	1,000								
Jackson Bros.	1,500	Poplar Creek	900	40					
Little Brushy Coal Co.	24,000	Brushy Mountain	1,622	32					
Wiley Coal Co.	5,200	Mt. Carbon	900	42					
Oliver Coal Co.	5,070	Coal Creek	800	48	50.71	44.81	2.75	0.25	2.08
Oliver Springs Coal & Clay Co.	1,255	Coal Creek	950	20					
Poplar Creek Coal Co.	974	Coal Creek	900	48					
Prudential Coal Co.	29,090	Coal Creek	1,200	40					
State of Tennessee.	283,359	Brushy Mt.	1,620	34	62.31	32.32	5.37		0.81
OVERTON COUNTY									
Brier Hill Collieries	52,200	Bon Air No. 2	1,782	36	62.54	30.85	5.44	1.09	1.56
East Fork Coal & Coke Co.	5,957	Bon Air No. 2	1,600	34	53.90	38.98	5.60	1.52	1.83
Overton Coal & Coke Co.	32,000	Bon Air No. 2	1,668	60					
Lusk, J. C.	1,836	Bon Air No. 2	1,600	34					
REBA COUNTY									
Dayton Coal & Iron Co.	72,027	Nelson	840	34	51.82	31.15	16.63		1.50
Durham Coal and Iron Co.	60,297	Richland No. 5	1,250	30	60.24	28.97	9.45	1.34	0.82
Penn Coal & Lumber Corp.	2,880		1,800	36	55.37	30.33	13.21	1.09	1.37
ROANE COUNTY									
Roane Iron Co.	179,500	Sewanee	1,080	54	58.72	31.15	9.98	2.50	4.55
SCOTT COUNTY									
Baker Coal & Coke Co.	6,400	Dean	1,000	32					
Glen Mary Coal & Coke Co.	46,560	No. 4	1,470	26	61.63	36.73	1.64		0.29
Pine Knot Coal Co.	7,955	Paint Rock	1,470	28	58.56	37.15	2.70	1.59	0.69
Southern Clay Mfg. Co.	7,067	Glen Mary No. 4	1,700	17					
Stanley Coal Co.	8,199	Paint Rock	1,470	27	58.56	37.15	2.70	1.59	0.69
Terry Coal Co.	9,640	Paint Rock	1,400	33	57.00	36.75	3.25	2.00	0.60
Va. Mining Co.	60,150	No. 4	1,400	36	56.43	35.78	4.85	1.13	1.81
SQUATCHIE COUNTY									
Chattanooga Iron & Coal Co.	112,406	Sewanee	1,665	46	58.36	29.72	11.92		1.44
WHITE COUNTY									
Bon Air Coal & Iron Co.	237,940	Bon Air	1,857	36	57.50	33.00	7.50		2.00
Bon Air Mines		Bon Air	1,857	36	57.50	33.00	7.50		2.00
Eastland Mine		Sewanee	1,800	48					
Ravenscroft Mine		Bon Air	1,879	54	57.00	37.00	4.90		1.10
Clifty Consolidated Coal Co.	124,439	Sewanee	1,600	36-42					

EMPLOYES, WAGES PAID AND DAYS ACTIVE.

This table gives the average number of employes in and about the coal mines of Tennessee, and the nature of their employment by counties and districts for 1912; also average number of days active and total amount of wages received by employes.

Employes in and around Tennessee coal mines in 1912; also total amount paid for labor and total number of days active.

COUNTIES AND DISTRICTS	UNDERGROUND WORKERS							OUTSIDE WORKERS				Grand total Workers Inside and Outside	Total Amount Paid for Labor	Av. No. of Days Active
	Pick Miners	Haulage Men	Foremen	Machine Miners	Mch. Run. and Helpers	Others Inside	Total Inside	Blacksmiths	Timber Men	Others Outside	Total Outside			
	1	2	3	4	5	6	7	8	9	10	11	12	25-36	44
FIRST DISTRICT:														
Bledsoe.....	36	6	1			1	44	1		5	6	50		170
Cumberland.....	33	5	2			2	42	1	1	6	8	50		236
Fentress.....	78	13	2	20	2	10	125	1	2	31	34	159		175
Grundy.....	316	31	6			15	368	4	7	17	28	396		253
Marion.....	600	88	12	9	9	96	814	11	13	142	166	980		237
Overton.....	100	15	4			14	133	2	2	15	19	152		221
Sequatchie.....	116	17	2			21	156	2	1	95	98	254		293
White.....	202	64	6	122	60	76	530	11	12	81	104	634		249
Total.....	1,481	239	35	151	71	235	2,212	33	38	392	463	2,675	\$1,438,726	238
SECOND DISTRICT:														
Hamilton.....	369	72	7			103	551	8	7	96	111	662		237
Morgan.....	486	94	21	41	35	105	782	9	22	83	114	896		168
Rhea.....	102	29	3			11	145	3	2	42	47	192		258
Roane.....	128	49	5			54	236	2	6	30	38	274		296
Scott.....	146	20	10	80	16	13	285	3	8	13	24	309		209
Total.....	1,231	264	46	121	51	286	1,999	25	45	264	334	2,333	\$ 952,753	204
THIRD DISTRICT:														
Anderson.....	443	105	16	64	16	63	707	13	28	97	138	845		197
Campbell.....	1,516	262	44	347	169	178	2,516	40	64	299	403	2,919		223
Claiborne.....	672	192	21	155	47	147	1,234	17	33	129	179	1,413		201
Total.....	2,631	559	81	566	232	388	4,457	70	125	525	720	5,177	\$2,692,544	213
Grand Total.....	5,343	1,062	162	838	354	909	8,668	128	208	1,181	1,517	10,185	\$5,084,023	216

a Of this number, 454 were at the State mines at Petros.

WAGES PER DAY PAID EMPLOYEES.

This table gives the average wages per day paid to employes in and about the coal mines of Tennessee for 1912.

Average wages paid per day to employes of Tennessee coal mines in 1912.

COUNTIES AND DISTRICTS	UNDERGROUND WORKERS							OUTSIDE WORKERS				Grand Total Workers Inside and Outside
	Pick Miners	Haulage Men	Foremen	Machine Miners	Machine Runners and Helpers	Others Inside	Total Inside	Blacksmiths	Timber Men	Others Outside	Total Outside	
	13	14	15	16	17	18	19	20	21	22	23	24
FIRST DISTRICT												
Bledsoe.....												
Cumberland.....												
Fentress.....												
Grundy.....												
Marion.....												
Overton.....												
Sequatchie.....												
White.....												
Total.....	\$ 2.56	\$ 1.70	\$ 3.34	\$ 2.24	\$ 1.98	\$ 1.82	\$ 2.36	\$ 2.07	\$ 2.06	\$ 1.74	\$ 1.79	\$ 2.26
SECOND DISTRICT												
Hamilton.....												
Morgan.....												
Rhea.....												
Roane.....												
Scott.....												
Total.....	\$ 2.06	\$ 1.78	\$ 3.43	\$ 2.60	\$ 3.79	\$ 1.63	\$ 2.07	\$ 2.12	\$ 1.74	\$ 1.48	\$ 1.57	\$ 2.00
THIRD DISTRICT												
Anderson.....												
Campbell.....												
Claiborne.....												
Total.....	\$ 2.52	\$ 2.31	\$ 4.53	\$ 2.25	\$ 2.45	\$ 2.31	\$ 2.47	\$ 2.58	\$ 2.27	\$ 2.18	\$ 2.24	\$ 2.44
Grand Total.....	\$ 2.45	\$ 2.04	\$ 3.96	\$ 2.31	\$ 2.53	\$ 1.97	\$ 2.37	\$ 2.37	\$ 2.12	\$ 1.91	\$ 1.97	\$ 2.31

AMOUNT PAID EMPLOYEES.

The following table gives the amount paid to each class of coal employees in Tennessee for 1912 by districts:

Amount paid each class of coal employees in Tennessee in 1912 by districts.

KIND OF EMPLOYEES	FIRST DISTRICT		SECOND DISTRICT		THIRD DISTRICT		TOTAL	
	Total Amount Paid	Per Cent of Total Cost	Total Amount Paid	Per Cent of Total Cost	Total Amount Paid	Per Cent of Total Cost	Total Amount Paid	Per Cent of Total Cost
Pick Miners.....	\$ 901,036	62.63	\$ 518,342	54.41	\$ 1,412,495	52.46	\$ 2,831,873	55.70
Haulage Men.....	96,890	6.73	96,082	10.09	274,982	10.21	467,963	9.21
Foremen.....	27,854	1.94	32,142	3.37	78,507	2.92	138,503	2.72
Machine Miners.....	80,629	5.60	65,106	6.83	271,604	10.08	417,339	8.21
Machine runners and helpers.....	33,392	2.32	39,392	4.14	121,077	4.50	193,861	3.81
Others inside.....	101,513	7.06	95,031	9.97	190,854	7.09	387,398	7.62
Total inside.....	\$ 1,241,323	86.28	\$ 846,095	88.81	\$ 2,349,519	87.26	\$ 4,436,937	87.27
Blacksmiths.....	16,232	1.13	\$ 10,530	1.13	\$ 38,510	1.43	\$ 65,272	1.29
Timbermen.....	18,649	1.29	15,991	1.68	60,471	2.25	95,111	1.87
Others outside.....	162,522	11.30	79,837	8.38	244,044	9.06	486,403	9.57
Total outside.....	\$ 197,403	13.72	\$ 106,658	11.19	\$ 343,025	12.74	\$ 647,086	12.73
Grand total inside and outside.....	\$ 1,438,726	100.00	\$ 952,753	100.00	\$ 2,692,544	100.00	\$ 5,084,023	100.00

PRODUCTION AND VALUE OF COAL.

This table gives the coal product of Tennessee coal mines for 1912, together with the disposition of the product and the average value per ton obtained.

Coal product and values, disposition of product and average value per ton obtained in 1912.

COUNTY	COAL PRODUCT (SHORT TONS)					COAL VALUES	
	Loaded for Shipment	Used for Fuel and Steam	Sold Local Trade and Employees	Coked	Total Product	Total Value	Average Value per Ton
	37	38	39	40	41	42	43
Anderson.....	535,720	16,797	5,717	-----	558,234	\$ 581,560	\$ 1.04
Bledsoe.....	17,068	150	50	-----	17,268	19,700	1.14
Campbell.....	1,742,207	44,039	21,167	-----	1,807,413	2,189,992	1.21
Claiborne.....	1,235,908	21,840	1,462	-----	1,259,210	1,257,450	1.00
Cumberland.....	35,550	325	290	-----	36,165	38,882	1.08
Fentress.....	98,872	3,080	520	-----	102,472	112,663	1.10
Grundy.....	243,938	652	791	37,484	282,865	306,233	1.08
Hamilton.....	306,351	12,169	7,373	57,392	383,285	442,011	1.15
Marion.....	626,379	8,743	4,979	15,385	655,486	809,321	1.23
Morgan.....	359,476	12,379	3,352	73,696	a448,903	a491,056	1.09
Overton.....	88,400	2,124	1,469	-----	91,993	93,698	1.02
Rhea.....	21,998	9,329	1,543	102,334	135,204	159,312	1.18
Roane.....	-----	21,059	3,002	155,439	179,500	218,155	1.22
Scott.....	132,124	12,269	1,578	-----	145,971	177,964	1.22
Sequatchie.....	71,451	3,424	1,225	36,306	112,406	118,026	1.05
White.....	343,486	15,749	3,144	-----	362,379	406,680	1.12
Total.....	5,858,928	184,128	57,662	478,036	6,578,754	\$ 7,422,703	\$ 1.13

a The product of the State operations at Petros amounted to 283,359 short tons, valued at \$314,982, or \$1.11 per ton. The product of Morgan County, excluding the operations of the State mines, amounted to 165,544 short tons, valued at \$176,074, or \$1.06 per ton.

PRODUCT AND VALUE OF COAL IN 1912 COMPARED WITH 1911.

This table gives the product, with the value thereof, and the value per ton of coal mined in Tennessee by counties and districts for 1912 as compared with 1911.

Coal product in Tennessee in 1912 as compared with 1911.

COUNTIES AND DISTRICTS	1912			1911			Increase (+) or Decrease (-) 1912	
	Product (Short Tons)	Value (Dollars)	Value per Ton	Product (Short Tons)	Value (Dollars)	Value per Ton	Product (Short Tons)	Value (Dollars)
First District:								
Bledsoe.....	17,268	\$ 19,700	\$ 1.14	26,150	\$ 28,765	\$ 1.10	- 8,882	- \$ 9,065
Cumberland.....	36,165	38,882	1.08	28,852	35,165	1.22	+ 7,313	+ 3,717
Fentress.....	102,472	112,663	1.10	111,683	119,617	1.07	- 9,211	- 6,954
Grundy.....	282,865	306,233	1.08	257,084	282,287	1.10	+ 25,781	+ 23,946
Marion.....	655,486	509,321	1.23	517,980	664,484	1.28	+ 137,506	+ 144,837
Overton.....	91,993	93,698	1.02	79,137	83,411	1.05	+ 12,856	+ 10,287
Squatchie.....	112,406	118,026	1.05	86,147	94,077	1.09	+ 26,259	+ 23,949
White.....	362,379	406,680	1.12	352,741	382,928	1.08	+ 8,638	+ 23,752
Total.....	1,661,034	\$ 1,905,203	\$ 1.15	1,460,774	\$ 1,690,734	\$ 1.16	+ 200,260	+ \$214,469
Second District:								
Hamilton.....	383,285	\$ 442,011	\$ 1.15	331,251	\$ 376,140	\$ 1.14	+ 52,034	+ \$65,871
Morgan.....	448,903	491,056	1.09	454,840	473,228	1.04	- 5,937	+ 17,828
Rhea.....	135,204	159,312	1.18	150,486	199,794	1.33	- 15,232	- 40,482
Roane.....	179,500	218,155	1.22	185,802	216,923	1.17	- 6,302	+ 1,232
Scott.....	145,971	177,964	1.22	132,714	165,903	1.25	+ 13,257	+ 12,061
Total.....	1,292,863	\$ 1,488,498	\$ 1.15	1,255,043	\$ 1,431,988	\$ 1.14	+ 37,820	+ \$56,510
Third District:								
Anderson.....	558,234	\$ 581,560	\$ 1.04	740,737	\$ 661,357	\$.89	- 182,503	- \$ 79,797
Campbell.....	1,807,413	2,189,992	1.21	1,724,786	2,005,234	1.16	+ 82,627	+ 184,758
Claiborne.....	1,259,210	1,257,450	1.00	1,284,884	1,282,063	1.00	- 25,674	- 24,613
Total.....	3,624,857	\$ 4,029,002	\$ 1.11	3,750,407	\$ 3,948,654	\$ 1.05	- 125,550	+ \$ 80,348
Grand Total.....	6,578,754	\$ 7,422,703	\$ 1.13	6,466,224	\$ 7,071,376	\$ 1.09	+ 112,530	+ \$351,327

RECAPITULATION.

DISTRICT	INCREASE IN 1912		DECREASE IN 1912	
	Product (Short Tons)	Value	Product (Short Tons)	Value
First.....	200,260	\$ 214,469		
Second.....	37,820	56,510		
Third.....		80,348	125,550	
Total.....	238,080	\$ 351,327		
Total Increases.....			125,550	
Total Decreases.....			238,080	\$ 351,327
Net Increase.....			+ 112,530	+ 351,327

PRODUCTION OF COAL IN TENNESSEE 1840-1912.

The following statement shows coal production of Tennessee from earliest times, 1840 to close of 1912, and coal values of Tennessee from 1873 to 1912 inclusive:

Coal product and values of Tennessee, 1840 to 1912, inclusive.

YEAR	Product (Short tons)	Value (Dollars)	Value per ton	YEAR	Product (Short tons)	Value (Dollars)	Value per ton
1840*	558			1876	550,000	\$ 605,000	\$ 1.10
1841	600			1877	450,000	495,000	1.10
1842	1,000			1878	375,000	412,000	1.10
1843	4,500			1879	496,131	545,744	1.10
1844	10,000			1880	641,042	769,250	1.20
1845	18,000			1881	750,000	900,000	1.20
1846	25,000			1882	850,000	1,020,000	1.20
1847	30,000			1883	1,000,000	1,150,000	1.15
1848	40,000			1884	1,200,000	1,380,000	1.15
1849	52,000			1885	1,440,957	1,585,052	1.10
1850	60,000			1886	1,714,390	1,885,719	1.10
1851	70,000			1887	1,900,000	2,090,000	1.10
1852	75,000			1888	1,967,297	2,164,026	1.10
1853	85,000			1889	1,925,689	2,338,309	1.21
1854	90,000			1890	2,169,585	2,386,543	1.10
1855	100,000			1891	2,404,484	2,655,045	1.10
1856	115,000			1892	2,332,677	2,635,924	1.13
1857	125,000			1893	1,902,258	2,048,449	1.08
1858	135,000			1894	2,180,879	2,119,481	0.97
1859	150,000			1895	2,319,720	2,157,340	0.93
1860*	165,300			1896	2,663,714	2,251,064	0.86
1861	150,000			1897	2,880,994	2,316,239	0.81
1862	140,000			1898	3,084,748	2,340,346	0.77
1863	100,000			1899	3,736,134	3,287,797	0.88
1864	100,000			1900	3,904,048	4,294,928	1.10
1865	100,000			1901	3,785,672	4,115,974	1.09
1866	100,000			1902	4,232,332	5,278,921	1.25
1867	110,000			1903	4,810,758	6,173,724	1.28
1868	125,000			1904	4,847,242	5,617,095	1.16
1869	130,000			1905	5,552,576	6,496,865	1.17
1870*	133,418			1906	6,272,457	7,565,286	1.20
1871	180,000			1907	6,940,911	8,482,899	1.22
1872	224,000			1908	6,082,851	6,961,393	1.14
1873	350,000	\$ 385,000	\$ 1.10	1909	6,207,483	6,757,824	1.09
1874	350,000	385,000	1.10	1910	6,908,688	7,626,840	1.10
1875	360,000	396,000	1.10	1911	6,466,224	7,071,376	1.09
				1912	6,578,754	7,422,703	1.13

*U. S. census (fiscal report). All other data from 1841 to 1872, inclusive, obtained from U. S. Geological Survey (fiscal report).

RANK OF COUNTIES IN THE PRODUCTION OF COAL.

This table gives the rank of the counties that produce coal first with reference to quantity of product, and then with reference to value of product, together with the percentage of the total coal product of the State contributed by each county.

Relative rank of coal-producing counties in Tennessee in 1912, with amount and value of product, and percentage of each.

Rank	COUNTY	Amount of Product (Short Tons)	Per cent of Total Product	Rank	COUNTY	Value of Product	Per cent of Total Value
1	Campbell.....	1,807,413	27.47	1	Campbell.....	\$ 2,189,992	29.50
2	Claiborne.....	1,259,210	19.14	2	Claiborne.....	1,257,450	16.94
3	Marion.....	655,486	9.96	3	Marion.....	809,321	10.90
4	Anderson.....	558,234	8.49	4	Anderson.....	581,560	7.83
5	Morgan.....	448,903	6.83	5	Morgan.....	491,056	6.62
6	White.....	383,285	5.83	6	White.....	442,011	5.95
7	Hamilton.....	362,379	5.51	7	Hamilton.....	406,680	5.48
8	Grundy.....	282,865	4.30	8	Grundy.....	306,233	4.13
9	Roane.....	179,500	2.73	9	Roane.....	218,155	2.94
10	Scott.....	145,971	2.22	10	Scott.....	177,964	2.40
11	Rhea.....	135,204	2.05	11	Rhea.....	159,312	2.15
12	Sequatchie.....	112,406	1.71	12	Sequatchie.....	118,026	1.59
13	Fentress.....	102,472	1.56	13	Fentress.....	112,663	1.52
14	Overton.....	91,993	1.39	14	Overton.....	93,698	1.26
15	Cumberland.....	36,165	.55	15	Cumberland.....	38,882	.52
16	Bledsoe.....	17,268	.26	16	Bledsoe.....	19,700	.27
	Total.....	6,573,754	100.00		Total.....	\$7,422,703	100.00

RANK OF COAL PRODUCING COUNTIES, 1891-1912.

The following table shows relative rank of coal-producing counties in Tennessee from 1891 to 1912, inclusive:

Relative rank of coal-producing counties from 1891 to 1912.

COUNTY	YEAR.																					
	1891	1892	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
Anderson.....	1	1	1	1	2	1	1	1	1	1	1	1	3	3	3	3	3	3	3	3	3	4
Bledsoe.....												14	15	15	15	16	16	14	16	16	16	16
Campbell.....	6	3	3	4	4	2	2	2	3	2	2	3	2	2	1	1	1	1	1	1	1	1
Claiborne.....	11	6	5	5	5	6	6	5	4	4	3	2	1	1	2	2	2	2	2	2	2	2
Cumberland.....	14	14	14	14	14	13	13	13	13	12	12	11	10	10	14	14	14	15	13	15	15	15
Fentress.....														14	12	12	13	10	12	12	12	13
Franklin.....	12	12	12	12	13	14	14	14	15	15												
Grundy.....	2	2	2	2	1	3	3	6	5	5	6	5	6	6	6	6	5	5	6	7	8	8
Hamilton.....	4	8	7	6	6	9	7	9	7	8	7	6	7	7	8	8	8	12	8	8	7	6
Marion.....	3	4	4	3	3	4	4	4	6	6	5	7	5	5	5	7	7	6	4	4	4	3
Morgan.....	8	11	10	11	11	5	5	3	2	3	4	4	4	4	4	4	4	4	5	5	5	5
Overton.....												15	15	13	13	13	13	15	13	14	14	14
Putnam.....	13	13	13	13	12	12	12	12	12	13	13							17	16			
Rhea.....	5	7	9	8	10	11	10	7	8	7	9	8	8	8	9	9	9	9	11	10	10	11
Roane.....	9	9	11	9	9	8	8	10	9	10	10	10	11	11	10	11	11	8	9	9	9	9
Scott.....	7	5	6	7	7	7	11	11	11	11	11	12	12	12	11	10	10	11	10	11	11	10
Sequatchie.....										14	14	14	13	14	16	16	15	12		15	13	13
White.....	10	10	8	10	8	10	9	8	10	9	8	9	9	9	7	5	6	7	7	6	6	7

It will be observed from this table that Anderson County, with the exception of the year 1895, maintained the lead from 1891 to 1902, inclusive, when it was assumed and held by the county of Claiborne for two years. It was then assumed and is now held by the county of Campbell, with Claiborne ranking second and Marion third. As compared with 1911, Marion County has captured third position from Anderson; Hamilton has captured sixth position from White; Scott has captured tenth position from Rhea; Sequatchie has captured twelfth position from Fentress.

Rank of coal-producing States in 1910 and 1911, with quantity and value of product and percentage of each.

1910

Production				Value			
Rank	State or Territory	Quantity (Short Tons)	Per- centage of total produc- tion	Rank	State or Territory	Value	Per- centage of total value
1	Pennsylvania:			1	Pennsylvania:		
	Anthracite.....	84,485,236	16.8		Anthracite.....	\$ 160,275,302	25.5
	Bituminous.....	150,521,526	30.0		Bituminous.....	153,029,510	24.3
2	West Virginia.....	61,671,019	12.3	2	West Virginia.....	56,665,061	9.0
3	Illinois.....	45,900,246	9.1	3	Illinois.....	52,405,897	8.3
4	Ohio.....	34,209,668	6.8	4	Ohio.....	35,932,288	5.7
5	Indiana.....	18,389,815	3.7	5	Indiana.....	20,813,659	3.3
6	Alabama.....	16,111,462	3.2	6	Alabama.....	20,236,853	3.2
7	Kentucky.....	14,623,319	2.9	7	Colorado.....	17,026,934	2.7
8	Colorado.....	11,973,736	2.4	8	Kentucky.....	14,405,887	2.3
9	Iowa.....	7,928,120	1.6	9	Iowa.....	13,903,913	2.2
10	Wyoming.....	7,533,088	1.5	10	Wyoming.....	11,706,187	1.9
11	Tennessee.....	7,121,380	1.4	11	Washington.....	9,764,465	1.5
12	Virginia.....	6,507,997	1.3	12	Tennessee.....	7,925,350	1.3
13	Maryland.....	5,217,125	1.0	13	Kansas.....	7,914,709	1.3
14	Kansas.....	4,921,451	1.0	14	Virginia.....	5,877,486	.9
15	Washington.....	3,911,899	.8	15	Oklahoma.....	5,867,947	.9
16	New Mexico.....	3,508,321	.7	16	Maryland.....	5,835,058	.9
17	Missouri.....	2,982,433	.6	17	Montana.....	5,329,322	.8
18	Montana.....	2,920,970	.6	18	Missouri.....	5,328,285	.8
19	Oklahoma.....	2,646,226	.5	19	New Mexico.....	4,877,151	.8
20	Utah.....	2,517,809	.5	20	Utah.....	4,224,556	.7
21	Arkansas.....	1,905,958	.4	21	Texas.....	3,160,965	.5
22	Texas.....	1,892,176	.4	22	Arkansas.....	2,979,213	.5
23	Michigan.....	1,544,967	.3	23	Michigan.....	2,930,771	.5
24	North Dakota.....	399,041	.1	24	North Dakota.....	595,139	.1
25	Georgia.....	177,245	.1	25	Georgia.....	259,122	.1
26	Oregon.....	67,533		26	Oregon.....	235,229	
27	California and Alaska.....	12,164		27	California and Alaska.....	33,336	
28	Idaho.....	4,448		28	Idaho.....	17,426	
	Total.....	501,596,378	100.0		Total.....	\$ 629,557,021	100.0

(U. S. Geological Survey.)

Rank of coal-producing States in 1910 and 1911, with quantity and value of product and percentage of each—Continued.

1911

Production				Value			
Rank	State or Territory	Quantity (Short Tons)	Per- centage of total production	Rank	State or Territory	Value	Per- centage of total value
1	Pennsylvania:			1	Pennsylvania:		
	Anthracite.....	90,464,067	18.2		Anthracite.....	\$175,189,392	28.0
	Bituminous.....	144,754,163	29.2		Bituminous.....	146,347,858	23.4
2	West Virginia.....	59,831,580	12.1	2	Illinois.....	59,519,478	9.5
3	Illinois.....	53,679,118	10.8	3	West Virginia.....	53,670,515	8.6
4	Ohio.....	30,759,986	6.2	4	Ohio.....	31,810,123	5.1
5	Alabama.....	15,021,421	3.0	5	Alabama.....	19,079,949	3.0
6	Indiana.....	14,201,355	2.9	6	Indiana.....	15,326,908	2.4
7	Kentucky.....	13,706,939	2.8	7	Colorado.....	14,747,764	2.4
8	Colorado.....	10,157,383	2.0	8	Kentucky.....	13,617,217	2.2
9	Iowa.....	7,331,648	1.5	9	Iowa.....	12,663,807	2.0
10	Virginia.....	6,864,667	1.4	10	Wyoming.....	10,508,863	1.7
11	Wyoming.....	6,744,864	1.4	11	Kansas.....	9,645,572	1.5
12	Tennessee.....	6,433,156	1.3	12	Washington.....	8,174,170	1.3
13	Kansas.....	6,254,228	1.3	13	Tennessee.....	7,269,734	1.2
14	Maryland.....	4,685,795	.9	14	Missouri.....	6,431,066	1.0
15	Missouri.....	3,760,607	.7	15	Oklahoma.....	6,291,494	1.0
16	Washington.....	3,572,815	.7	16	Virginia.....	6,254,894	1.0
17	New Mexico.....	3,148,158	.6	17	Montana.....	5,342,168	.9
18	Oklahoma.....	3,074,242	.6	18	Maryland.....	5,197,066	.8
19	Montana.....	2,970,358	.6	19	New Mexico.....	4,525,925	.7
20	Utah.....	2,513,175	.5	20	Utah.....	4,248,666	.7
21	Arkansas.....	2,106,789	.4	21	Arkansas.....	3,396,849	.5
22	Texas.....	1,974,593	.4	22	Texas.....	3,273,288	.5
23	Michigan.....	1,476,074	.3	23	Michigan.....	2,791,461	.4
24	North Dakota.....	502,628	.1	24	North Dakota.....	720,489	.1
25	Georgia and N. Carolina.....	165,330		25	Georgia and N. Carolina.....	246,448	
26	Oregon.....	46,661	.1	26	Oregon.....	108,033	.1
27	California and Alaska.....	11,647		27	California and Alaska.....	23,297	
28	Idaho and Nevada.....	1,521		28	Idaho and Nevada.....	4,872	
Total.....		496,221,168	100.0	Total.....		\$628,866,876	1000.

(U. S. Geological Survey.)

Quantity and value of coal produced in the United States in 1911 in short tons.

STATE	1911		Increase (+) or decrease (-), 1911		Percentage of increase or decrease, 1911	
	Quantity	Value	Quantity	Value	Quantity	Value
Alabama.....	15,021,421	\$ 19,079,949	- 1,090,041	-\$1,156,904	- 6.77	- 5.72
Arkansas.....	2,106,789	3,396,849	+ 200,831	+ 417,636	+10.54	+14.02
California and Alaska.....	11,647	23,297	- 517	- 10,039	- 4.25	-30.11
Colorado.....	10,157,383	14,747,764	- 1,816,353	- 2,279,170	-15.17	-13.39
Georgia and North Carolina.....	165,330	246,448	- 11,915	- 12,674	- 6.72	- 4.89
Idaho and Nevada.....	1,821	4,872	- 2,627	- 12,554	-59.60	-72.04
Illinois.....	53,679,118	59,519,478	+ 7,778,872	+ 7,113,581	+16.95	+13.57
Indiana.....	14,201,355	15,326,808	- 4,188,460	- 5,486,851	-22.78	-26.36
Iowa.....	7,331,648	12,663,507	- 596,472	- 1,240,406	- 7.52	- 8.92
Kansas.....	6,254,228	9,645,572	+ 1,332,777	+ 1,730,863	+27.08	+21.87
Kentucky.....	13,706,839	13,617,217	- 916,480	- 788,670	- 6.27	- 5.47
Maryland.....	4,685,795	5,197,066	- 531,330	- 637,992	-10.18	-10.93
Michigan.....	1,476,074	2,701,461	- 58,893	- 139,310	- 3.84	- 4.75
Missouri.....	3,760,607	6,431,066	+ 778,174	+ 1,102,781	+26.09	+20.70
Montana.....	2,976,358	5,342,168	+ 55,388	+ 12,846	+ 1.90	+ 0.24
New Mexico.....	3,148,158	4,525,925	- 360,163	- 351,226	-10.27	- 7.20
North Dakota.....	502,628	720,489	+ 103,587	+ 125,350	+25.96	+21.06
Ohio.....	30,759,986	31,810,123	- 3,449,682	- 4,122,165	-10.08	-11.47
Oklahoma.....	3,074,242	6,291,494	+ 429,016	+ 423,547	+16.17	+ 7.22
Oregon.....	46,661	108,033	- 20,872	- 127,196	-30.91	-54.07
Pennsylvania bituminous.....	144,754,163	146,347,858	- 5,767,363	- 6,681,652	- 3.83	- 4.37
Tennessee.....	6,433,156	7,209,734	- 688,224	- 715,616	- 9.66	- 9.03
Texas.....	1,974,593	3,273,288	+ 82,417	+ 112,323	+ 4.36	+ 3.56
Utah.....	2,513,175	4,248,666	- 4,634	+ 24,110	- 0.18	+ 0.57
Virginia.....	6,864,667	6,254,804	+ 356,670	+ 377,318	+ 5.48	+ 6.42
Washington.....	3,572,815	8,174,170	- 339,084	- 1,590,295	- 8.67	-16.29
West Virginia.....	59,831,580	53,670,515	- 1,839,439	- 2,994,546	- 2.98	- 5.28
Wyoming.....	6,744,864	10,508,863	- 788,224	- 1,197,324	-10.46	-10.23
Total bituminous.....	405,757,101	\$ 451,177,484	- 11,354,041	- 18,104,235	- 2.72	- 3.86
Pennsylvania anthracite.....	90,464,067	175,189,392	+ 5,978,831	+ 14,914,090	+ 7.08	+ 9.31
Grand Total.....	496,221,168	\$ 626,366,876	- 5,375,210	- 3,190,145	- 1.07	- 0.51

(U. S. Geological Survey.)

Coal production of the United States in 1911, by States, in short tons.

STATE	Loaded at mines for shipment	Sold to local trade and used by employees	Used at mines for steam and heat	Made into coke	Total quantity	Total value	Average price per ton	Average number of days active	Average number of em- ployees
Alabama	11,135,563	141,191	615,335	3,129,332	15,021,421	\$19,079,949	\$1.27	227	22,707
Arkansas	1,996,803	16,560	93,426	.....	2,106,789	3,396,849	1.61	133	5,857
California and Alaska	4,981	5,986	680	.....	11,647	23,297	2.00	265	60
Colorado	8,104,712	303,473	324,947	1,424,251	10,157,393	14,747,764	1.45	207	14,316
Georgia and North Carolina	86,161	1,007	5,485	72,677	165,330	246,448	1.49	277	514
Idaho and Nevada .....	.....	1,791	30	.....	1,821	4,872	2.68	228	13
Illinois	49,163,827	2,806,197	1,623,319	85,775	53,679,118	59,519,478	1.11	188	76,600
Indiana	13,134,954	657,978	408,423	.....	14,201,355	15,336,808	1.08	182	21,182
Iowa	6,594,899	532,519	204,230	.....	7,331,648	12,663,507	1.73	203	16,599
Kansas	5,332,062	142,624	178,967	575	6,254,228	9,646,572	1.64	189	11,625
Kentucky	12,652,280	604,617	334,444	115,498	13,706,839	13,617,217	.99	191	21,821
Maryland	4,547,600	72,060	66,145	.....	4,685,795	5,197,066	1.11	243	5,881
Michigan	1,347,144	70,127	58,803	.....	1,476,074	2,791,461	1.89	218	3,323
Missouri	3,230,474	456,316	73,817	.....	3,760,607	6,431,066	1.71	183	9,991
Montana	2,739,529	80,985	155,844	.....	2,976,368	5,342,168	1.79	220	3,866
New Mexico	2,308,462	27,264	45,324	767,108	3,148,158	4,525,925	1.44	230	4,007
North Dakota	359,075	130,655	12,898	.....	502,628	720,489	1.43	229	640
Ohio	28,114,734	1,961,939	632,777	636	30,769,986	31,810,123	1.03	179	46,035
Oklahoma	2,840,002	47,274	186,966	.....	3,074,242	6,291,494	2.06	156	8,790
Oregon	22,407	10,216	14,038	.....	46,661	108,033	2.32	179	189
Pennsylvania, bituminous	107,055,470	3,613,660	3,265,496	30,819,637	144,754,163	146,347,858	1.01	233	168,274
Tennessee	5,751,404	97,643	122,146	461,963	6,433,156	7,209,734	1.12	232	10,703
Texas	1,877,901	56,912	39,780	.....	1,974,593	3,273,288	1.66	226	5,353
Utah	2,004,892	27,797	98,790	381,696	2,513,175	4,248,666	1.69	236	3,060
Virginia	5,230,894	82,349	181,660	1,369,764	6,864,667	6,264,804	.91	261	7,392
Washington	3,230,991	155,932	138,140	47,752	3,572,815	8,174,170	2.29	225	6,498
West Virginia	54,171,423	1,045,547	1,073,907	3,540,703	59,831,580	53,670,515	.90	221	66,730
Wyoming	6,386,936	83,932	273,996	.....	6,744,864	10,508,863	1.56	230	7,924
Total bituminous	340,026,580	13,234,541	10,279,813	42,217,167	406,757,101	461,177,484	1.11	211	549,750
Pennsylvania, anthracite	78,894,589	2,296,451	9,273,027	.....	90,464,067	175,189,392	1.94	246	175,585
Grand Total	418,920,169	15,530,992	19,552,840	42,217,167	496,221,168	626,366,876	1.26	220	722,335

(U. S. Geological Survey.)

WORLD'S PRODUCTION OF COAL.

In the following table a statement is presented showing the coal production of the principal countries of the world in the years nearest to that under review for which the figures are obtainable. For the sake of convenience the quantities are expressed in the measurement customary to each country, and are reduced for comparison to short tons of 2,000 pounds:

The world's production of coal.

COUNTRIES	Usual Unit in producing country	Equivalent in short tons
United States (1911).....long tons..	443,054,614	496,221,168
Great Britain (1911).....do.....	271,891,899	304,518,927
Germany (1911) metric tons..	234,259,061	258,223,763
Austria-Hungary (1910) do.....	48,649,768	53,626,639
France (1911) do.....	39,350,041	43,375,550
Russia and Finland (1911).....do.....	23,197,000	25,570,063
Belgium (1911) do.....	23,125,140	25,490,842
Japan (1910) do.....	15,681,324	17,285,523
China (1910) do.....	15,000,000	16,534,500
India (1910) long tons..	12,047,413	13,493,103
Canada (1911) short tons..	11,291,553	11,291,553
New South Wales (1911).....long tons..	8,691,604	9,734,596
Spain (1910) metric tons..	4,057,532	4,472,618
Transvaal (1911) long tons..	3,878,286	4,343,680
Mexico (1910) metric tons..	2,450,000	2,700,635
Natal (1911) long tons..	2,394,238	2,681,547
New Zealand (1910).....long tons..	2,197,362	2,461,045
Asiatic Russia (1910).....metric tons..	1,244,000	1,371,261
Chile (1911) do.....	1,158,660	1,277,191
Holland (1909) do.....	1,120,852	1,235,515
Queensland (1911) long tons..	891,568	998,556
Bosnia and Herzegovina (1911).....metric tons..	769,763	848,510
Brazil, Switzerland, and Turkey ¹ do.....	745,000	821,215
Italy (1910) do.....	562,153	619,661
Orange Free State (Orange River Colony) (1910)....long tons..	504,445	564,978
Dutch East Indies (1909).....metric tons..	508,771	560,818
Indo-China (1909) do.....	384,053	423,342
Victoria (1910) long tons..	369,059	413,346
Sweden (1911) metric tons..	311,809	343,707
Peru (1908) do.....	311,122	342,950
Servia (1909) do.....	292,300	322,202
Bulgaria (1909) do.....	227,362	250,621
Western Australia (1909).....long tons..	214,302	240,018
Formosa (1909) metric tons..	183,412	202,175
Roumania (1907-8) do.....	160,783	177,231
Rhodesia (1909) long tons..	152,583	170,893
British Borneo (1909).....do.....	130,985	146,703
Cape Colony (Cape of Good Hope) (1910).....do.....	87,551	98,057
Tasmania (1910) do.....	82,455	92,350
Korea (1909) do.....	53,493	59,912
Spitzbergen (1910) metric tons..	40,000	44,092
Philippine Islands (1910).....do.....	27,000	29,762
Venezuela (1906) do.....	14,064	15,503
Portugal (1909) do.....	6,274	6,916
Greece (1909) do.....	3,873	4,269
Unspecified long tons..	50,000	56,000
Total.....		1,303,763,496
Percentage of the United States.....		38.1

¹ Brazil 1909, Turkey 1911; no date for Switzerland.

The statistics of labor troubles in 1910 and 1911 are presented in the following table:

Statistics of labor strikes in the coal mines of the United States in 1910 and 1911.

STATE	1910			1911		
	Number of men on strike	Total days lost	Average number of days lost per man	Number of men on strike	Total days lost	Average number of days lost per man
Alabama.....	25	1,250	50	210	1,260	6
Arkansas.....	4,873	713,210	146	665	4,615	7
Colorado.....	2,044	195,558	96	150	32,375	216
Georgia.....	270	2,970	11			
Illinois.....	67,218	9,133,953	136	5,543	100,588	18
Indiana.....	12,638	423,894	34	4,577	146,636	32
Iowa.....	9,209	408,563	44	1,622	31,870	20
Kansas.....	10,346	1,578,027	153	984	8,507	9
Kentucky.....	1,475	15,197	10	1,080	34,008	32
Michigan.....	1,663	86,789	52			
Missouri.....	7,774	1,218,599	157	504	24,216	48
Montana.....	345	38,280	111	529	8,114	15
North Dakota.....				34	69	2
Ohio.....	24,746	1,334,631	54	9,530	350,039	37
Oklahoma.....	8,213	1,247,828	152	444	15,106	34
Pennsylvania.....	60,098	2,700,746	45	5,601	148,124	26
Tennessee.....				163	1,630	10
Texas.....	1,776	108,230	61	60	300	5
Utah.....				208	624	3
Washington.....	101	303	3	2,099	22,215	10
West Virginia.....	1,630	13,985	9	1,510	16,483	11
Wyoming.....	1,196	12,792	11			
Total bituminous.....	215,640	19,234,785	89	35,513	946,779	27
Pennsylvania anthracite.....	2,853	15,739	6	5,900	36,958	6

(U. S. Geological Survey.)

DRAFT ANIMALS, EXPLOSIVES AND MINE CARS.

This table gives the number of draft animals employed in coal mining in Tennessee in 1912; also the amount and kind of explosives, and the number of cars used.

Draft animals, explosives, and mine cars used in Tennessee coal mines in 1912.

COUNTIES AND DISTRICTS	Draft Animals			Explosives Used			Mine Cars in Use
	Inside	Outside	Total	Powder (Kegs)	Permissible (Pounds)	Dynamite (Pounds)	
	45	46	47	48	49	50	
FIRST DISTRICT:							
Bledsoe.....	7	1	8	575	-----	-----	90
Cumberland.....	5	5	10	1,650	-----	346	64
Fentress.....	1	2	3	4,848	-----	6,018	203
Grundy.....	67	10	77	5,250	-----	-----	420
Marion.....	61	23	84	16,277	17,740	3,261	1,148
Overton.....	11	-----	11	5,356	-----	535	186
Sequatchie.....	17	4	21	2,195	-----	763	210
White.....	49	10	59	10,023	-----	8,645	409
Total.....	218	55	273	46,174	17,740	19,568	2,730
SECOND DISTRICT:							
Hamilton.....	91	9	100	16,106	-----	18,160	929
Morgan.....	59	16	75	4,516	8,700	31,543	1,119
Rhea.....	31	8	39	1,312	30,657	699	374
Roane.....	53	7	60	3,516	7,043	30	452
Scott.....	24	9	33	6,220	-----	8,000	577
Total.....	258	49	307	31,670	46,400	58,432	3,451
THIRD DISTRICT:							
Anderson.....	76	23	99	1,192	33,165	1,469	1,649
Campbell.....	176	42	218	35,927	8,540	22,805	3,919
Claiborne.....	113	38	151	5,542	550	20,354	1,944
Total.....	365	103	468	42,661	47,255	44,428	7,512
Grand total.....	841	207	1,048	120,505	111,395	122,428	13,693

MINING MACHINES IN USE, AND IMPROVEMENTS.

This table gives the number and the make of mining machines in use in Tennessee in 1912, together with the quantity of coal mined by machines, and the cost of improvements for the year.

Mining machines, coal mined with machines, and improvements in Tennessee coal mines in 1912.

COUNTY AND DISTRICT	Mining Machines in Use, Make and Number												Coal Mined with Machines	Improvements Made		
	Pick					Chain Breast					Grand Total Mch.	Inside		Outside	Total	
	Harrison	Ingersoll-Sargent	Sullivan	Other Kinds	Total Pick	Jeffrey-Electric	Sullivan	Goodman	Morgan-Gardner	Total Ch. Breast						Other Kinds
	52	53	54	55	56	57	58	59	60	61	61a	62	63	64	65	66
FIRST DISTRICT																
Bledsoe																
Cumberland																
Fentress							1			1		1	16,000	\$ 150	\$ 206	\$ 356
Grundy																
Marion			6		6							6	55,310	2,250	16,636	18,886
Overton														400		400
Sequatchie														10,000	24,791	34,791
White		20	6		26			2		2	4	32	167,568	2,000	300	2,300
Total		26	6		32		1	2		3	4	39	228,878	14,800	41,933	56,733
SECOND DISTRICT																
Hamilton														14,700	47,300	62,000
Morgan		10			10	3	3			6		16	64,955	40,879	59,126	100,005
Rhea																
Roane														1,000		1,000
Scott						2	2	1	3	8		8	60,150	1,500		1,500
Total		10			10	5	5	1	3	14		24	125,105	58,079	106,426	164,505
THIRD DISTRICT:																
Anderson			3	2	5	6	2			8		13	96,592	7,327	1,586	8,913
Campbell	40	41	12	4	97	3	12	5	5	25	3	125	445,333	13,500	34,812	48,312
Claiborne	7	17		1	25		6	1		7		32	277,175	10,500	30,500	41,000
Total	47	58	15	7	127	9	20	6	5	40	3	170	819,100	\$ 31,327	\$ 66,898	\$ 98,225
Grand total	47	94	21	7	169	14	26	9	8	57	7	233	1,173,083	\$ 104,206	\$ 215,257	\$ 319,463

STATISTICS IN DETAIL ON COAL.

The following figures give brief statistics in detail as to coal in Tennessee in 1912:

EMPLOYEES:

Average number inside.....	8,668
Average number outside.....	1,517
Total average number of employees in and around mines.....	10,185
Total amount paid for labor.....	\$5,084,023
Average wages paid per day.....	2.31
Total average number of days active.....	216

PRODUCT (short tons):

First District.....	1,661,034
Second District.....	1,292,863
Third District.....	3,624,857
Total Product.....	6,578,754

VALUE OF PRODUCT:

First District.....	\$1,905,203
Second District.....	1,488,498
Third District.....	4,029,002
Total value of product.....	\$7,422,703
Average value per ton of product.....	1.13
Net increase in product as compared with 1911 (short tons).....	112,530
Net increase in value as compared with 1911.....	\$351,327

DRAFT ANIMALS EMPLOYED:

Inside.....	941
Outside.....	207
Total number of draft animals.....	1,046

EXPLOSIVES USED:

Powder (number of kegs).....	120,505
Permissible explosives (number of pounds).....	111,395
Dynamite (number of pounds).....	122,428

Mine cars in use.....	13,653
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MINING MACHINES IN USE:

Pick.....	169
Chain Breast.....	57
Other kind.....	7
Total number of mining machines in use.....	233

Quantity of coal mined with machines (short tons).....	1,173,083
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IMPROVEMENTS MADE:

Value of inside improvements.....	\$ 104,206
Value of outside improvements.....	215,257
Total value of all improvements made.....	\$ 319,463

ACCIDENTS, NUMBER OF:

Fatal.....	18
Non-fatal.....	118
Total number of children rendered fatherless.....	21
Total number of wives made widows.....	8

FATAL ACCIDENTS.

Fatal accidents in Tennessee coal mines in 1912 by counties and mines.

NAME OF COUNTY AND MINE	NAME OF PERSON KILLED	Date of Accident	Occupation	Experi-ence	Married or Single	No of Children	Cause of Accident
ANDERSON COUNTY							
Wind Rock	M. L. Snodgrass	Oct. 18	Miner	6 mos.	M	3	Fall of slate.
CAMPBELL COUNTY							
Bear Wallow	Walter Hamilton	July 25	Miner	— years	S		Fall of roof
Rock Springs	Geo. W. Sturm	Aug. 28	Weigher	2 mos.	S		On incline
Rock Springs	Virty Terry	July 8	Miner	7 mos.	S		Fall of roof
Southern	B. Calcari	Aug. 14	Miner	14 mos.	S		Fall of rock
Westbourne	James Willoughby	Aug. 4	Fireman	2 mos.	S		Powder explosion
CLAIBORNE COUNTY							
Buffalo	E. D. Kidwell	Nov. 6	Miner	3 years	S		Fall of slate
Buffalo	Lee Oxendine	April 27	Miner	6 years	S		Fall of slate
Pruden	Wm. Wilson	Jan. 19	Miner	5 years	M	3	Fall of slate
Standard	W. M. Boyd	Dec. 16	Miner	16 years	M	7	Fall of slate
CUMBERLAND COUNTY							
Clear Creek	R. G. Frisby	Jan. 16	Driver	1 year	S		Fall of slate
GRUNDY COUNTY							
Pryor Ridge 1	D. W. Layne	Feb. 1	Miner	20 years	M	3	Gasoline Mine Motor
MARION COUNTY							
Battle Creek	Eugene Lewis	Jan. 2	Miner	6 years	S		Fall of coal
MORGAN COUNTY							
Big Brushy 1-2	Ed Bennett	Aug. 5	Miner	3 years	M	1	Fall of slate
Little Brushy	J. H. Esell	July 29	Miner	3 years	M		Fall of slate
State Mines	Hugh Freeman	July 3	Miner	3 years			Fall of slate
State Mines	Washington Jones	April 16	Miner	3 mos.	M	3	Fall of roof
WHITE COUNTY							
Bon Air Shaft	Weymon Bohanon	July 30	Cager	10 mos.	M	1	Electric Mine Motor

RECAPITULATION OF FATAL ACCIDENTS.

The following table gives the recapitulation of fatal accidents in Tennessee coal mines for 1912, by counties, mines, occupations and causes:

Recapitulation of fatal accidents in Tennessee coal mines in 1912.

COUNTY	No.	NAME OF MINE	No.	OCCUPATION	No.	CAUSE OF ACCIDENT	No.
Anderson.....	1	Battle Creek	1	Pick Miners.....	14	NUMBER KILLED:	
Campbell.....	5	Bear Wallow	1	Drivers.....	1	Underground	
Claiborne.....	4	Big Brushy, 1-2	1	Firemen	1	1. By falls of roof (coal,	11
Cumberland.....	1	Bon Air Shaft	1	Cagers.....	1	rock, etc.).....	
Grundy.....	1	Buffalo	2	Weighers	1	2. By fall of coal (other	
Marion.....	1	Clear Creek	1			than roof coal).....	3
Morgan.....	5	Little Brushy.....	1			3. By mine cars and	
White.....	1	Pruden.....	1			haulage motors	2
		Pryor Ridge 1	1			Total number killed	
		Rock Springs.....	2			inside of mines	16
		Southern.....	1			Surface	
		Standard	1			1. Incline house	1
		State Mines.....	2			2. Explosives (powder) ..	1
		Westbourne.....	1				
		Wind Rock	1			Total killed on surface ..	2
Total.....	18	Total.....	18	Total.....	18	Grand total.....	18

RECAPITULATION.

FIRST DISTRICT		SECOND DISTRICT	
Cumberland.....	1	Morgan.....	4
Grundy	1		
Marion.....	1		
White.....	1		
Total.....	4	Total.....	4

THIRD DISTRICT

Anderson.....	1
Campbell.....	5
Claiborne.....	4
Total.....	10
Grand total.....	18

FATAL ACCIDENTS, 1894-1912.

This table gives miscellaneous statistics of fatal accidents in the coal mines of Tennessee from 1894 to 1912, inclusive, showing total number killed, number of wives made widows, number of children rendered fatherless, total average number of employes, number of employes to each life lost, total number of tons of coal mined, and total number of tons of coal mined to each employe.

General statistics of fatal accidents in Tennessee coal mines, 1894-1912.

YEAR	Number Killed	Number of Wives Made Widows	Number of Children Made Fatherless	Total Average Number of Employes	Average Number of Employes to Each Life Lost	Coal Mined (Short Tons)	Coal Mined to Each Life Lost (Short Tons)	Coal Mined by Each Employe (Short Tons)
1894.....	12	6	16	5,542	461	2,180,879	181,740	393.52
1895.....	37	19	50	5,120	138	2,319,720	62,665	453.07
1896.....	22	12	29	6,531	296	2,663,714	121,078	407.85
1897.....	10	6	13	6,337	633	2,880,994	288,099	454.63
1898.....	18	10	24	7,820	411	3,084,748	162,499	394.40
1899.....	20	11	27	7,694	384	3,736,134	186,806	485.50
1900.....	10	6	13	8,691	869	3,904,048	390,404	453.50
1901.....	44	20	62	8,418	191	3,785,672	86,038	449.70
1902.....	226	137	324	8,759	39	4,232,332	18,727	483.20
1903.....	26	13	26	9,673	372	4,810,758	185,029	499.40
1904.....	28	10	16	9,972	356	4,847,242	173,123	486.08
1905.....	29	13	30	10,517	363	5,552,576	191,468	527.96
1906.....	33	16	41	10,736	325	6,272,457	190,077	584.24
1907.....	31	19	51	11,098	358	6,940,911	223,900	625.42
1908.....	34	23	47	11,122	327	6,082,851	178,908	547.00
1909.....	31	18	32	10,946	343	6,207,483	200,241	567.08
1910.....	38	30	48	11,174	294	6,908,688	181,808	618.28
1911.....	111	73	154	10,825	97	6,466,224	58,254	597.34
1912.....	18	8	21	10,185	566	6,578,754	365,486	645.83

a Twenty-five of these were killed by coal dust explosion at the Dayton Coal & Iron Company mines, at Dayton.

b Twenty of these were killed in the explosion of the Richland mine at Dayton, operated by the Dayton Coal & Iron Company.

c Of this number, sixteen were killed in the explosion of the Nelson mine at Dayton, operated by the Dayton Coal & Iron Company, and one hundred and eighty-four were killed in the explosion of the Fraterville mine at Coal Creek, operated by the Coal Creek Coal Co.

d Eighty-four of these were killed in the explosion of the Cross Mountain mine at Briceville, operated by the Knoxville Iron Company.

NON-FATAL ACCIDENTS.

The following table gives the non-fatal accidents in the coal mines of Tennessee for 1912, by counties and mines, alphabetically, and gives the names and occupation of those hurt, together with the date, cause and extent of injury:

Non-fatal accidents in Tennessee coal mines in 1912, by counties and mines.

COUNTY AND MINE	NAME OF PERSON INJURED	DATE OF ACCIDENT	OCCUPATION	CAUSE AND EXTENT OF INJURY
ANDERSON COUNTY				
Black Diamond 5.....	W. P. Hammock.....	March 27..	Timberman.....	Flying coal or rock from shot; thigh cut.
Black Diamond 5.....	Ed Leach.....	Apr. 15.....	Miner.....	Fall of slate; thigh broken
Buck Mountain.....	Rosecoe Akins.....	Aug. 19.....	Miner.....	Cap coal and rock; ankle broken
Buck Mountain.....	Don Prater.....	Dec. 9.....	Miner.....	Fall of coal; ankle, foot and back
Cross Mountain 1.....	Burgin Kever.....	Oct. 12.....	Driver.....	Fall of slate; head, hand and wrist
Cross Mountain 1.....	Frank Todlock.....	Nov. 9.....	Miner.....	Animal and mine car; ribs broken
Cross Mountain 3.....	Arthur Russell.....	March 23..	Driver.....	Door; fingers bruised
Wind Rock.....	Ed Fritts.....	Jan. 15.....	Motorman.....	Electricity; thigh bruised.
Wind Rock.....	James McElroy.....	Feb. 27.....	Machine helper.....	Machine and screw jack; jaw broken, head cut
Wind Rock.....	Charles Queener.....	Jan. 23.....	Machine helper.....	Mining machine; leg broken
Wind Rock.....	Sam Smith.....	Apr. 11.....	Miner.....	Fall of coal; nose bruised and lacerated
CAMPBELL COUNTY				
Bear Wallow.....	Bird Dougherty.....	Mar. 11.....	Machine helper.....	Fall of slate; arm fractured
Caryville.....	Sterl Bullock.....	Feb. 27.....	Miner.....	Fall of slate; fingers bruised
Caryville.....	Jim Slagle.....	Dec. 24.....	Tippelman.....	Mine car; finger bruised.
Caryville.....	James Stripling.....	Feb. 6.....	Miner.....	Fall of slate; rib broken, shoulder bruised
Chaska.....	Charley Walker.....	Oct. 8.....	Miner.....	Fall of slate; shoulder dislocated
Falls Branch.....	John Bough.....	Oct. 2.....	Trackman.....	Mine cars; rib broken.
Falls Branch.....	Hugh Hatmaker.....	Oct. 10.....	Miner.....	Switch; toe broken.
Kimberly.....	Charles Disney.....	Mar. 1.....	Miner.....	Fall of slate; back and ankle bruised
Red Ash.....	Steve Leigh.....	June 30.....	Miner.....	Fall of slate; leg broken
Rex 1.....	Dan Frederick.....	July 31.....	Miner.....	Draw slate; leg fractured
Rock Springs.....	Henry Melton.....	July 8.....	Miner.....	Fall of roof; face and back bruised
Rock Springs.....	Ben Williams.....	July 8.....	Miner.....	Fall of roof; Spine and pelvis fractured
Southern.....	W. M. Blackburn.....	Dec. 3.....	Miner.....	Mine car; chest bruised
Southern.....	Henry Hester.....	May 8.....	Miner.....	Powder explosion; face and hands burned
Southern.....	J. M. Pack.....	Jan. 2.....	Miner.....	Draw slate; collar bones and ribs broken
Southern.....	Stoke Rose.....	Nov. 28.....	Miner.....	Powder explosion; chest and back bruised
Southern.....	N. Shelton.....	July 30.....	Miner.....	Fall of slate; back injured
Tenn.-Jellico.....	S. S. McFarlon.....	Jan. 17.....	Miner.....	Draw slate; foot mashed
Tenn.-Jellico.....	A. Rutherford.....	Jan. 23.....	Miner.....	Fall of coal; ankle mashed
Tenn.-Jellico.....	Sam Vanover.....	Jan. 15.....	Miner.....	Draw slate; hips mashed
Westbourne.....	Fred Keplinger.....	July 24.....	Miner.....	Powder explosion; body burned
Westbourne.....	Terry Lanham.....	July 24.....	Miner.....	Powder explosion; body burned
Westbourne.....	Cleve Moore.....	July 24.....	Miner.....	Powder explosion; body burned
Westbourne.....	Henry Moore.....	July 24.....	Miner.....	Powder explosion; body burned
Westbourne.....	Clay Quintrell.....	July 24.....	Miner.....	Powder explosion; body burned
CLAIBORNE COUNTY				
Fork Ridge.....	Ben Eater.....	Oct. 14.....	Motorman.....	Fall of slate; foot crushed
Fork Ridge.....	Geo. Johnson.....	Mar. 16.....	Laborer.....	Track rail; finger cut off
Fork Ridge.....	Tom Jones.....	Mar. 9.....	Laborer.....	Fall of slate; head cut, elbow fractured
Fork Ridge.....	Hubert Kivet.....	May 7.....	Motorman.....	Motor car; end of finger cut off
Fork Ridge.....	Hubert Kivet.....	July 20.....	Motorman.....	Fall of slate; finger cut off, foot crushed
Fork Ridge.....	James McBee.....	June 24.....	Miner.....	Fall of slate; thigh fractured
Fork Ridge.....	H. Marcum.....	May 22.....	Miner.....	Fall of slate; end of finger cut off
Fork Ridge.....	Mason Poore.....	Oct. 28.....	Miner.....	Fall of slate; leg fractured
King Mountain.....	Abe Conard.....	Feb. 15.....	Miner.....	Fall of draw slate; arm, shoulder and hips
Pruden.....	Silas Taylor.....	Aug. 21.....	Miner.....	Fall of slate; back, shoulders and ankle
Standard.....	Doc Aslinger.....	July 9.....	Miner.....	Fall of slate
Standard.....	John Laffy.....	Apr. 15.....	Miner.....	Fall of coal; arm broken, chin cut
Sterling.....	Robert Langham.....	Nov. 1.....	Miner.....	Mine car; ankle broken

Non-fatal accidents in Tennessee coal mines in 1912, by counties and mines—continued.

COUNTY AND MINE	NAME OF PERSON INJURED	DATE OF ACCIDENT	OCCUPATION	CAUSE AND EXTENT OF INJURY
GRUNDY COUNTY				
Coalmont A.	Jack Hobbs	Feb. 17	Miner	Shot explosion; face, neck and hands burned
Coalmont A.	John O'Neal	Feb. 17	Miner	Shot explosion; face and hands burned
Coalmont B.	Geo. Sanders	Nov. 23	Miner	Fall of coal; foot and ankle bruised
Coalmont M.	Beecher Meeks	Oct. 7	Miner	Fall of slate; leg cut and bruised
HAMILTON COUNTY				
Big Soddy No. 7.	Frank Gibson	Feb. 6	Driver	Mine car; leg cut
Sale Creek	Ed. Gothard	Feb. 27	Driver	Mine cars; back and shoulders contused
Sale Creek	John Schybert	Feb. 1	Miner	Powder explosion; burned and out
Soddy 1-2.	Will Gibson	Feb. 8	Driver	Mine car; back and hips bruised
Soddy 1-2.	Richard Loeb	Jan. 13	Trapper	Haulage rope; arm fractured
Soddy No. 4.	A. S. Nicholson	Jan. 17	Miner	Fall of slate; thighs bruised.
MARION COUNTY				
Battle Creek	Cal Henderson	Apr. 18	Miner	Mine cars; bone in foot broken
St. Anthony 1-5.	C. S. Dickerson	Oct. 30	Miner	Fall of rock; leg broken
Whitwell	Clint Colston	May 2	Pumper	Motor; skull fractured, collar bone broken
Whitwell	George Condra	Jan. 5	Driver	Animal and rope; leg broken
Whitwell	G. W. Cook	Nov. 29	Miner	Mine car; finger broke, hand bruised
Whitwell	J. B. Cook	June 5	Miner	Mine car; foot mashed and sprained
Whitwell	Icy Doss	Dec. 16	Motorman	Motor; wrist bruised and sprained
Whitwell	Alex Dowman	Mar. 14	Driver	Mine car; bone of hand fractured
Whitwell	Alex Dowman	June 20	Driver	Fall of coal; leg broken
Whitwell	H. B. Egert	May 14	Miner	Fall of slate; arm bruised
Whitwell	Wash Gerren	June 28	Greaser	Mine car; finger mashed
Whitwell	Houston Green	Mar. 16	Miner	Mine car; hip and groin bruised
Whitwell	Ed Griffith	Dec. 12	Motor Coupler	Motor; ankle sprained
Whitwell	Jno. Griffith	June 6	Miner	Mine car; thumb mashed
Whitwell	Lee Hamilton	Apr. 10	Miner	Mine car; finger cut and bruised
Whitwell	Alfred Harrison	Feb. 9	Miner	Mine car; wrist dislocated
Whitwell	Walter Hartman	April 30	Coupler	Mine car; finger mashed
Whitwell	Hodges Havron	April 7	Driver	Mine car; foot sprained
Whitwell	M. L. Henderson	July 25	Miner	Fall of slate; back and shoulders bruised
Whitwell	Walter Haloway	Feb. 12	Motorman	Lamp oil; wrist burned
Whitwell	George A. Kilgore	April 16	Trackman	Fall of rock; toe broken
Whitwell	A. M. Lamb	July 1	Driver	Mine car; ankle sprained
Whitwell	Jno. Lamb	Sept. 17	Motorman	Mine cars; leg bruised
Whitwell	Earlie Layne	June 11	Miner	Mine car; finger mashed
Whitwell	Jno. D. Mason	Jan. 16	Bratticeman	Loading iron on car; eye hurt
Whitwell	Harry D. McCoy	Jan. 5	Laborer	Motor truck; ankle and toe bruised
Whitwell	Harry McCoy	July 10	Miner	Timbers; foot mashed
Whitwell	Tom Morrison	July 18	Driver	Mine car; hand bruised and sprained
Whitwell	Bill Powell, Jr.	Sept. 14	Driver	Mine cars; leg bruised
Whitwell	M. C. Pryor	May 7	Carpenter	Wrench and track; rib fractured
Whitwell	George Pyburn	June 6	Motorman	Plank extended over track; back and hips
Whitwell	G. W. Richardson	Sept. 16	Miner	Fall of slate; shoulders, back and leg
Whitwell	Alexander Rollins	Mar. 13	Miner	Fall of slate; hand cut
Whitwell	Robert Sewell	June 1	Miner	Timbers; head cut
Whitwell	Claude Shirley	Jan. 3	Trackman	Pick; leg cut
Whitwell	Ike Shockley	Sept. 11	Miner	Fall of coal; hand bruised.
Whitwell	Ike Shockley	Dec. 31	Miner	Fall of slate; hand cut and bruised
Whitwell	Jesse Smith	April 15	Coupler	Mine cars; finger mashed
Whitwell	Love Springs	June 1	Miner	Fall of slate; hip and back bruised
Whitwell	Lewis W. Thomas	May 14	Miner	Mine car; foot contused
Whitwell	John Way	Aug. 6	Miner	Fall on auger; artery on wrist punctured
Whitwell	Jno. Weddle	June 22	Pipeline man	Pipe; toe mashed
MORGAN COUNTY				
Big Brushy	T. C. Castile	June 13	Miner	Fall of slate; leg bruised
Mt. Carbon	Alex Hurt	Aug. 9	Miner	Fall of slate; leg broken
Prudential	Wm. Gray	Dec. 21	Miner	Fall of slate (horse back); back bruised and str.
Prudential	W. R. King	Aug. 21	Miner	Mine car; head and arm

Non-fatal accidents in Tennessee coal mines in 1912, by counties and mines—continued.

COUNTY AND MINE	NAME OF PERSON INJURED	DATE OF ACCIDENT	OCCUPATION	CAUSE AND EXTENT OF INJURY
ROANE COUNTY				
Rockwood Old.....	Lee McNeal.....	June 8.....	Miner.....	Fall of slate; hips hurt, finger broken
Rockwood Old.....	Tom Pool.....	Aug. 12.....	Miner.....	Fall of slate; leg broken and flesh torn
Rockwood Old.....	Tom Pogle.....	July 19.....	Miner.....	Fire damp exp.; face, neck, hand and arms bed
SCOTT COUNTY				
Glen Mary.....	Jack Heiman.....	July 11.....	Miner.....	Fall of slate; collar bone broken, thigh lacerated
SQUATCHIE COUNTY				
Douglas 2.....	Hubert Johnson.....	July 9.....	Laborer.....	Fall from car; arm bone broken
Douglas 2.....	Jno. W. Morgan.....	July 20.....	Miner.....	Fall of slate; leg bruised
Douglas 2.....	L. F. Thomson.....	Aug. 26.....	Miner.....	Mine car; internal injury, back sprained, finger
WHITE COUNTY				
Bon Air Shaft.....	Will Broom.....	July 13.....	Machine helper.....	Mining machine; finger cut off
Bon Air Shaft.....	Hubert Elder.....	July 18.....	Laborer.....	Fall of slate; back broken
Bon Air Shaft.....	Frank Holland.....	Jan. 4.....	Laborer.....	Fall of slate; leg broken
Bon Air Shaft.....	J. R. Trogden.....	Aug. 5.....	Machine helper.....	Fall of slate; hand cut and bruised
Clifty Creek 3.....	L. D. Golden.....	Jan. 3.....	Miner.....	Fall of roof; spine injured
Eastland No. 1.....	John Gridley, Jr.....	May 21.....	Miner.....	Fall of slate; foot mashed

RECAPITULATION OF NON-FATAL ACCIDENTS.

The following table gives a general recapitulation of non-fatal accidents in the coal mines of Tennessee for 1912:

Recapitulation of non-fatal accidents in Tennessee coal mines in 1912.

COUNTY	No.	NAME OF MINE	No.	OCCUPATION	No.	CAUSE OF ACCIDENT	No.
Anderson.....	11	Battle Creek.....	1	Pick Miners.....	73	UNDERGROUND	
Campbell.....	25	Bear Wallow.....	1	Machine Miners.....	5	Number injured:	
Claiborne.....	13	Big Brushy.....	1	Drivers.....	12	1. By falls of roof (coal,	
Grundy.....	4	Big Soddy 7.....	1	Trackmen.....	3	rock, etc.).....	43
Hamilton.....	6	Black Diamond 5.....	2	Motormen.....	8	2. By falls of face or pillow	
Marion.....	42	Bon Air Shaft.....	4			coal.....	11
Morgan.....	4	Buck Mountain.....	2	Timberman.....	13	3. By mine cars and loco-	
Roane.....	3	Caryville.....	3	Tipplemen.....	1	motives.....	27
Scott.....	1	Chaska.....	1	Trappers.....	14	4. By explosives.....	6
Sequatchie.....	3	Clifty Creek 3.....	1	Miscellaneous.....	14	5. By mine gases.....	1
White.....	6	Coalmont A.....	2			6. By electricity.....	1
		Coalmont B.....	1			7. By mining machines.....	3
		Coalmont M.....	1			8. By other causes.....	10
		Cross Mountain.....	2				
		Cross Mountain 3.....	1			Total underground.....	102
		Douglas 2.....	3			SURFACE	
		Eastland 1.....	1			Number injured:	
		Falls Branch.....	2			9. By mine cars and loco-	
		Fork Ridge.....	8			motives.....	8
		Glen Mary.....	1			10. By other causes.....	8
		Kimberly.....	1				
		King Mountain.....	1			Total surface.....	16
		Mt. Carbon.....	1				
		Pruden.....	1				
		Prudential.....	2				
		Red Ash.....	1				
		Rex 1.....	1				
		Rock Springs.....	2				
		Rockwood Old.....	3				
		Sale Creek.....	2				
		Soddy 1-2.....	2				
		Soddy 4.....	1				
		Southern.....	5				
		St. Anthony.....	1				
		Standard.....	2				
		Sterling.....	1				
		Tenn-Jellico.....	3				
		Westbourne.....	5				
		Whitwell 1-5.....	40				
		Wind Rock.....	4				
Total.....	118	Total.....	118	Total.....	118	Grand total.....	118

CAUSES OF FATAL AND NON-FATAL ACCIDENTS.

The following table gives the causes of fatal and non-fatal accidents in the Tennessee coal mines for 1912, by counties:

Causes of fatal and non-fatal accidents in Tennessee coal mines in 1912.

COUNTY	Fall of Roof or Coal		Gas and Dust Explosions		Mine Cars & Motors		Powder Exp. & Windy Sh.		Other Causes		Total	
	Killed	Inj.	Killed	Inj.	Killed	Inj.	Killed	Inj.	Killed	Inj.	Killed	Inj.
Anderson.....	1	5				1				5	1	11
Campbell.....	3	14				3	1	7	1	1	5	25
Claiborne.....	4	10				3					4	13
Cumberland.....	1										1	
Grundy.....		2			1			2			1	4
Hamilton.....		1				3		1				6
Marion.....	1	10				22			10		1	42
Morgan.....	4	3				1					4	4
Roane.....		2		1								3
Scott.....		1										1
Squatchie.....		1				2						3
White.....		5			1				1		1	6
Total.....	14	54		1	2	35	1	10	1	18	18	118

FATAL ACCIDENTS IN NORTH AMERICA.

This table shows the number of men killed in and about the mines in the United States, by states, also for British Columbia and Nova Scotia, from 1900 to 1912, inclusive.

Fatal accidents in coal mines 1900-1912.

STATES, TERRITORIES AND PROVINCES	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
Alabama.....	37	41	50	57	84	185	96	154	108	129	238	209	121
Arkansas.....										a	14	12	6
California.....													2
Colorado.....	29	55	73	40	89	60	88	99	61	99	323	91	95
Georgia and N Carolina.....													2
Illinois.....	94	99	99	156	157	199	155	165	183	213	143	172	159
Indiana.....	18	24	24	55	34	47	31	53	45	50	51	46	40
Iowa.....	29	27	55	21	31	24	37	35	38	28	33	40	19
Kansas.....	20	10	30	36	b16	36	30	52	31	35	17	42	28
Kentucky.....	17	21	19	25	19	31	40	32	40	33	86	45	51
Maryland.....	7	12	11	16	12	16	13	5	12	19	17	15	13
Michigan.....	10	6	6	8	7	8	6	7	6	9	6	7	8
Missouri.....	10	15	10	17	11	11	16	8	10	21	14	8	20
Montana.....	6	7	12	5	9	8	13	14	21	12	12	13	7
New Mexico.....	15	9	17	17	15	5	9	31	34	18	16	21	15
North Dakota.....										a	2	1	0
Ohio.....	68	72	81	124	118	114	126	153	112	115	151	109	133
Oklahoma.....	40	44	60	33	30	44	39	32	44	40	40	33	99
Oregon.....										a		1	1
Pennsylvania:													
Anthracite.....	411	513	300	518	595	644	557	708	678	567	601	710	584
Bituminous.....	265	301	456	402	536	479	477	806	572	506	539	529	437
Tennessee.....	10	44	226	26	28	29	33	31	34	31	38	111	18
Texas.....										a	7	8	2
Utah.....	209	9	8	7	9	7	7	8	8	16	15	14	18
Virginia.....										a	57	68	75
Washington.....	33	27	34	25	31	13	21	37	25	39	43	27	14
West Virginia.....	141	134	120	159	140	194	269	356	625	364	329	350	359
Wyoming.....										a	38	33	34
British Columbia.....	17	102	139	42	37	12	15	31	18	57	28	16	27
Nova Scotia.....	21	14	19	31	19	20	28	35	39	33	30	36	35
Total deaths.....	1,507	1,586	1,849	1,820	2,027	2,186	2,106	2,852	2,744	2,434	2,898	2,767	2,422

a—Not available.

b—Six months only.

Number of men killed in and about the

STATE.	KILLED UNDERGROUND.												
	Falls of roof (coal, rock, etc.)	Falls of coal (other than roof coal).	Mine cars and locomotives.	Gas explosions and burning gas.	Coal dust explosions. ^a	"Blown-out or windy shots."	Explosives ^b	Suffocation from mine gases.	Electricity (shock or burns).	Animals.	Mining machines.	Machines other than locomotives and mining machines.	Mine fires (burned, suffocated, etc.).
Alabama	46	1	14	2	128	...	5	...	6	...	...	...	...
Alaska	...	...	...	...	...	...	...	...	...	...	...	...	...
Arkansas	9	...	1	...	...	...	...	...	...	...	...	...	...
California	...	...	...	...	...	...	...	...	...	...	...	...	...
Colorado	41	6	12	...	17	1	1	2	2	...	1	...	...
Georgia	...	...	...	...	...	...	...	...	...	...	...	...	...
Idaho	...	...	...	...	...	...	...	...	...	...	...	...	...
Illinois	70	16	40	1	8	...	13	...	3	1	...	...	...
Indiana	17	2	4	1	2	1	10	...	2	...	1	...	...
Iowa	22	...	12	...	...	...	...	...	...	...	1	...	...
Kansas	20	...	...	7	...	3	3	3	1	...	...	...	...
Kentucky	26	1	3	...	1	...	3	...	4	...	1	...	...
Maryland	12	...	1	...	...	...	...	...	...	...	...	...	...
Michigan	3	1	...	...	...	...	...	...	2	...	...	...	...
Missouri	6	1	...	...	...	...	...	...	...	...	...	...	...
Montana	7	3	2	...	...	...	1	...	...	...	...	...	...
New Mexico.....	14	2	1	...	...	...	1	...	...	...	...	...	...
North Dakota...	...	...	...	...	...	...	1	...	...	...	...	...	...
Ohio	78	12	12	...	...	...	1	...	3	...	2	...	...
Oklahoma	9	...	6	3	...	4	4	...	1	...	...	...	2
Oregon	1	...	...	...	...	...	...	...	...	...	...	...	...
Pa. (anthra.)...	254	28	97	30	...	...	80	1	3	3	...	1	78
Pa. (bitum's)...	281	36	95	22	8	...	3	1	35	2	3	1	...
Tennessee	15	...	6	...	84	...	1	...	1	...	...	...	...
Texas	5	...	1	...	...	...	2	...	...	...	...	...	...
Utah	7	3	2	...	...	...	...	...	...	...	...	...	...
Virginia	35	...	18	5	...	...	...	...	2	...	...	...	...
Washington	11	...	6	...	...	...	2	1	2	...	...	...	...
West Virginia...	166	28	58	27	23	...	2	...	20	1	4	...	...
Wyoming	18	8	2	1	...	...	1	...	...	...	...	...	...
Total.....	1,173	148	393	99	271	9	134	8	87	7	13	2	80
Percent. of total	43.14	5.44	14.45	3.64	9.97	0.33	4.93	0.29	3.20	0.26	0.48	0.08	2.94

^a These dust explosions may have been started by powder or gas explosions or other initia^b Includes premature blasts, explosion of misfires, suffocation by gases from explosives.

coal mines in the United States, 1911.

		KILLED IN SHAFT.						KILLED ON THE SURFACE.							
Other causes.	Total killed inside of mine.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Breaking of cables, chains, etc.	Overwinding.	Other causes.	Total killed by shaft accidents.	Mine cars and mine locomotives.	Electricity (shock or burns).	Machinery.	Boiler explosions.	Railway cars and locomotives.	Other causes.	Total killed by surface accidents.	Total by States.
2	204	1					1					2	2	4	209
...	0						0							0	0
1	11					1	1							0	12
...	0						0							0	0
1	84					2	2	2				3		5	91
...	0						0							0	0
...	0						0							0	0
1	153	8	1			3	12	1		1		1	4	7	172
...	40	2					3	1				1	1	3	46
1	36	2	1	1			4							0	40
3	40	1					1				1			1	42
2	41						0	1		1		2		4	45
1	14						0					1		1	15
1	7						0							0	7
...	7						0							1	8
...	13						0					1		0	13
...	18						0			2		1		3	21
...	1						0							0	1
...	108						0					1		1	109
...	29					4	4							0	33
...	1						0							0	1
24	599	21	2	2	1	1	27	18	1	22	1	8	34	84	710
9	496	2				2	4	7	1	3		6	12	29	529
1	108						0	3	1			1	2	7	115
...	8						0							0	8
...	12						0				1	1		2	14
...	60						0	4					4	8	68
...	22	2					2	2		1				3	27
1	330	2					2	5	4	2		3	4	18	350
1	31						0	1		1				2	33
49	2,473	42	4	3	1	13	63	45	7	33	3	32	63	183	2,719
1.80	90.95	1.54	0.15	0.11	0.04	0.48	2.32	1.65	0.26	1.21	0.11	1.18	2.32	6.73	100.00

ting causes.

by flying pieces from blasts, etc.).

coal mines of the United States, 1912.

		KILLED IN SHAFT.						KILLED ON THE SURFACE.							
Other causes.	Total killed inside of mine.	Falling down shafts or slopes.	Objects falling down shafts or slopes.	Breaking of cables, chains, etc.	Overwinding.	Other causes.	Total killed by shaft accidents.	Mine cars and mine locomotives.	Electricity (shock or burns).	Machinery.	Boiler explosions.	Railway cars and locomotives.	Other causes.	Total killed by surface accidents.	Total by States.
1	110	2	1	...	...	1	4	7	...	1	...	3	...	7	121
...	0	...	...	...	...	...	0	...	...	...	...	...	...	0	0
...	5	...	...	...	...	1	1	...	...	...	...	...	...	0	6
...	2	...	...	...	...	...	0	...	...	...	...	...	...	0	2
2	91	1	...	...	...	1	2	1	...	...	...	1	...	2	95
...	2	...	...	...	...	...	0	...	...	...	...	...	...	0	2
...	0	...	...	...	...	...	0	...	...	...	...	...	...	0	0
1	141	6	1	1	1	2	11	...	...	...	...	3	4	7	159
...	39	...	...	...	...	...	0	...	...	...	...	...	1	1	40
...	19	...	...	...	...	...	0	...	...	...	...	...	...	0	19
...	26	...	...	...	...	1	1	...	...	...	...	1	...	1	28
2	41	...	...	...	1	-1	2	2	...	...	...	1	5	8	51
...	12	...	...	...	...	...	0	...	...	...	...	...	1	1	13
...	6	...	1	...	...	...	1	...	...	...	...	1	...	1	8
1	16	...	...	...	...	1	1	1	1	1	...	...	...	3	20
...	7	...	...	...	...	...	0	...	...	...	...	...	...	0	7
...	15	...	...	...	...	...	0	...	...	...	...	...	...	0	15
...	0	...	...	...	...	...	0	...	...	...	...	...	...	0	0
1	125	1	...	...	...	3	4	...	...	2	...	1	1	4	133
...	99	...	...	...	...	...	0	...	...	...	...	...	...	0	99
...	1	...	...	...	...	...	0	...	...	...	...	...	...	0	1
29	476	12	2	...	...	...	14	34	3	20	...	...	37	94	584
15	395	4	...	...	...	2	6	17	3	5	1	1	9	36	437
...	17	...	...	...	...	...	0	...	...	...	...	...	1	1	18
...	0	...	...	...	...	1	1	1	...	...	...	...	...	1	2
...	16	...	...	...	...	...	0	...	...	1	...	...	1	2	18
...	67	1	...	...	...	...	1	3	1	...	...	1	2	7	75
2	13	1	...	...	...	...	1	...	...	...	...	...	...	0	14
...	346	...	...	1	...	2	3	5	1	...	...	1	3	10	359
...	32	...	...	...	...	1	1	1	...	...	...	...	...	1	34
54	2,119	28	5	2	2	17	54	68	9	30	1	14	65	187	2,360
2.29	89.79	1.19	0.22	0.08	0.08	0.72	2.29	2.88	0.38	1.27	0.04	0.59	2.76	7.92	100.00

etc.

FATAL ACCIDENT RATE IN NORTH AMERICA.

This table shows the number of men killed per 1,000 employed, in the United States by states, also, for British Columbia and Nova Scotia from 1900 to 1912, inclusive.

Fatal accident rates per 1,000 employed in coal mines, 1900-1912.

STATES, TERRITORIES AND PROVINCES	1900	1901	1902	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912
Alabama.....	2.59	2.90	2.79	2.94	4.77	10.75	5.23	7.61	5.75	6.40	10.71	9.50	5.35
Arkansas.....										a	2.51	2.25	1.32
California and Alaska.....													38.46
Colorado.....	3.99	6.88	8.11	3.89	8.26	5.05	7.32	7.67	4.25	7.53	20.36	6.33	7.31
Georgia and N. Carolina..													4.44
Illinois.....	2.39	2.24	2.15	3.13	2.87	3.36	2.49	2.47	2.58	2.93	1.97	2.27	2.04
Indiana.....	2.03	1.98	1.83	3.64	1.91	2.63	1.58	2.79	2.36	2.64	2.33	2.19	1.85
Iowa.....	2.22	2.05	4.23	1.59	1.90	1.86	2.20	2.05	2.30	1.56	1.98	2.37	1.16
Kansas.....	1.87	1.05	3.22	3.61	3.09	2.97	2.95	4.35	2.74	3.04	1.32	3.55	2.40
Kentucky.....	1.88	2.15	1.58	1.85	1.37	2.06	2.39	1.82	2.15	1.76	4.23	1.87	2.10
Maryland.....	1.32	2.23	1.89	2.82	2.11	2.57	2.16	0.85	2.00	3.84	2.93	2.47	2.11
Michigan.....	6.11	3.26	4.24	2.54	2.58	2.16	2.83	2.43	1.94	3.04	1.68	2.16	2.57
Missouri.....	1.81	1.63	1.09	1.85	1.09	1.06	1.65	1.70	1.06	2.31	1.44	8.33	2.06
Montana.....	2.53	3.24	6.19	2.32	3.59	3.67	5.43	5.12	6.68	3.11	3.13	3.36	2.03
New Mexico.....	7.44	4.81	10.11	7.26	7.61	2.35	3.82	10.13	9.26	5.57	4.46	5.68	3.83
North Dakota.....										a	3.75	1.32	0.06
Ohio.....	2.14	2.15	2.16	3.00	2.57	2.58	2.71	3.20	2.23	2.45	3.45	2.40	2.92
Oklahoma.....	2.59	8.35	9.62	5.42	3.63	5.76	4.81	4.15	3.02	2.76	4.62	3.78	11.27
Oregon.....										a		3.29	4.50
Pennsylvania:													
Anthracite.....	2.86	3.47	2.03	3.41	3.69	3.83	3.35	4.19	3.39	3.31	3.55	4.08	3.36
Bituminous.....	2.44	2.56	3.26	2.65	3.44	2.90	2.76	4.40	3.15	2.72	3.07	3.09	2.65
Tennessee.....	1.15	5.23	25.80	2.69	2.81	2.76	3.07	2.79	3.06	2.77	3.19	9.98	1.75
Texas.....										a	1.67	1.61	0.39
Utah.....	138.96	5.06	3.24	3.21	4.06	3.57	3.69	3.07	2.99	5.36	4.91	4.06	5.41
Virginia.....										a	7.85	8.39	8.64
Washington.....	7.79	5.59	7.83	5.13	6.69	2.61	4.08	6.05	4.68	6.81	6.81	3.73	2.54
West Virginia.....	5.03	4.14	3.41	4.03	3.08	3.88	5.20	6.33	10.35	5.85	4.79	5.24	5.26
Wyoming.....										a	4.89	4.07	4.23
British Columbia.....	4.22	25.67	34.65	9.85	8.31	2.72	3.12	5.12	2.95	8.88	3.61	2.32	3.79
Nova Scotia.....	3.17	1.83	2.36	2.79	1.63	1.86	2.31	2.89	3.02	2.73	2.73	2.87	2.63
Average.....	3.25	3.21	3.48	3.16	3.33	3.40	3.20	4.15	3.84	3.39	3.89	3.77	3.26

a—Not available.

FATAL ACCIDENTS RATE IN NORTH AMERICA.

The following table gives the rate of fatal accidents per 1,000 employees in the coal mines of North America, by states and provinces:

Fatal accident rate per 1,000 employees and number of lives lost per million tons of coal mined in North America, by states and provinces, in 1912.

STATE OR PROVINCE	Tons of Coal Produced	Employees	FATAL ACCIDENTS		Lives Lost per 1,000,000 Tons of Coal Mined
			Number	Per 1,000 Employees	
Alabama.....	16,100,600	22,613	121	5.35	7.52
Arkansas.....	2,100,819	4,536	6	1.32	2.86
California and Alaska.....	11,333	52	2	38.46	176.56
Colorado.....	10,977,624	13,000	95	7.31	8.65
Georgia and North Carolina.....	227,703	450	2	4.44	8.78
Idaho and Nevada.....	2,964	20	0	0.00	0.00
Illinois.....	59,885,226	78,098	159	2.04	2.66
Indiana.....	16,286,718	21,651	40	1.85	2.62
Iowa.....	7,289,529	16,370	19	1.16	2.61
Kansas.....	6,996,182	11,646	28	2.40	4.01
Kentucky.....	16,490,521	24,304	51	2.10	3.09
Maryland.....	4,964,038	6,162	13	2.11	2.62
Michigan.....	1,206,230	3,113	8	2.57	6.63
Missouri.....	4,339,856	9,704	20	2.06	4.61
Montana.....	3,048,495	3,440	7	2.03	2.30
New Mexico.....	3,536,824	3,928	15	3.82	4.24
North Dakota.....	499,480	622	0	0.00	0.00
Ohio.....	31,528,727	45,527	133	2.92	3.85
Oklahoma.....	3,675,418	8,785	99	11.27	26.94
Oregon.....	41,637	222	1	4.50	24.02
Pennsylvania, Anthracite.....	84,361,598	174,030	584	3.36	6.92
Pennsylvania, Bituminous.....	161,865,488	165,144	437	2.65	2.70
Tennessee.....	6,473,228	10,309	18	1.75	2.78
Texas.....	2,188,612	5,127	2	0.39	0.91
Utah.....	3,016,149	3,328	18	5.41	5.97
Virginia.....	7,846,638	8,678	75	8.64	9.56
Washington.....	3,360,932	5,519	14	2.54	4.17
West Virginia.....	66,786,687	68,248	359	5.26	5.38
Wyoming.....	7,368,124	8,036	34	4.23	4.61
Total, U. S.....	534,466,580	722,662	2,360	3.27	4.42
British Columbia.....	3,389,120	7,130	27	3.79	7.97
Nova Scotia.....	7,619,000	13,297	35	2.63	4.59
Total.....	11,008,120	20,427	62	3.04	5.63
Grand total.....	545,474,700	743,089	2,422	3.26	4.44

PRODUCTION OF COAL AND ACCIDENTS IN FOREIGN COUNTRIES.

The following table gives the production of coal in several foreign countries, and the United States, and the number of employes, and the number of employes killed, in the mines of the respective foreign countries and in the United States:

COUNTRY	Year	PRODUCTION		Number Employed	Number Killed	Deaths per 1,000 Employed	Deaths per 1,000,000 Short Tons	Production in Short Tons Per One Death
		Metric Tons	Short Tons					
France	1909	37,840,000	41,711,000	190,748	223	1.17	5.35	187,000
France	1910	38,350,000	42,274,000	196,786	213	1.08	5.04	198,000
Belgium	1910	23,917,000	26,364,000	143,701	136	0.95	5.16	194,000
Belgium	1911	23,054,000	25,412,000	144,054	165	1.15	6.49	154,000
Austria (Steinkohle)	1910	13,774,000	15,183,000	69,969	65	0.93	4.28	234,000
Austria (Steinkohle)	1911	14,380,000	15,851,000	69,527	88	1.26	5.55	180,000
Austria (Braunkohle)	1910	25,133,000	27,704,000	56,699				
Austria (Braunkohle)	1911	25,265,000	27,849,609	54,902	76	1.38	2.73	336,422
Prussia (Steinkohle)	1910	143,965,000	158,694,000	577,263	1,140	1.97	7.13	139,000
Prussia (Steinkohle)	1911	151,521,000	167,022,000	586,538	1,176	2.00	7.04	142,000
Prussia (Braunkohle)	1910	56,644,000	62,439,000	56,186	73	1.30	1.17	855,329
Prussia (Braunkohle)	1911	60,532,000	66,721,400	55,154	93	1.69	1.54	660,882
		Long Tons						
England	1910	264,418,000	296,148,000	1,032,702	1,754	1.70	5.92	169,000
England	1911	271,878,000	304,503,000	1,049,897	1,232	1.17	4.05	247,000
New South Wales	1909	7,669,000	7,917,000	18,569	14	0.75	1.77	565,500
United States	1910		501,596,000	725,080	2,840	3.92	5.66	177,000
United States	1911		496,221,168	722,335	2,719	3.76	5.48	182,501

WAGE SCALES

The wage scales of the following mines are under the supervision of the United Mine Workers of America, District 19, and the information concerning same was furnished the department by Mr. Thos. M. Gann, Secretary and Treasurer, No. 712 Henson Building, Knoxville, Tenn.:

CAMPBELL COUNTY.

Falls Branch Coal Co., Wooldridge, Tenn.
Wooldridge Jellico Coal Co., Wooldridge, Tenn.

HAMILTON COUNTY.

Durham Coal & Iron Co., Chattanooga, Tenn.
Montlake Coal Co., Chattanooga, Tenn.

The general agreements, mine rules, and regulations under which these companies are operated, varies but little from year to year, and as they were published in full in the report of this department for the year 1911, they will not be here shown in detail, but reference is hereby made to this report.

CAMPBELL COUNTY.

Falls Branch Coal Co. and Wooldridge Jellico Coal Co.

A new contract was made in August, 1912, in which the conditions of the old contract were renewed; the prices on coal, were however, raised 5 cents per ton, the rate agreed upon being:

No. 1—Under 2½ feet.....	\$1.06
No. 2—2½ feet to 2 ft. 9 in.....	0.99.3
No. 3—2 ft. 9 in. to 3½ ft.....	0.92.5
No. 4—3 ft. 6 in. and over.....	0.85.7

The advance on all day work was 5.26 per cent.

HAMILTON COUNTY.

On September 28, 1912, agreements made with the Soddy Division of the Durham Coal & Iron Co., fixed the following prices for mining, which were an advance of 2 cents per ton over those of the year before:

Coal 36 inches and over.....	47 cents per ton
Coal 30 to 36 inches.....	53 cents per ton
Coal 24 to 30 inches.....	57 cents per ton
Coal 18 to 24 inches.....	67 cents per ton
Pillar coal	53 cents per ton

Day wages were advanced 2.5 per cent. The contract, with a few minor changes, was the same as that of the preceding year.

Montlake Coal Co.

The contract and prices in effect with this company are practically the same as in the preceding year, with the exception that the prices given are based on coal shot

on the solid, and the clause relative to undercutting the coal is omitted. The prices in effect for mining being:

Coal over 40 in.....	\$0.45
Coal 36 to 40 in.....	0.50
Coal 30 to 36 in.....	0.55
Coal 24 to 30 in.....	0.62
Coal below 24 in.....	special
Pillar coal	0.56
Entry stumps	0.55

DETAIL COAL MINE DATA

The following chapter gives the description and detailed data of the coal mines in Tennessee to December 31, 1912; the names and addresses of officials, location of mines, seam worked, system of development, haulage, ventilation, etc.; arranged alphabetically by counties and by mines:

ANDERSON COUNTY.

Black Diamond No. 1 Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Black Diamond Coal Co., Knoxville; *President*, J. W. Borches, Knoxville; *General Manager*, L. J. A. Petree, Coal Creek; *Superintendent*, L. F. Card, Coal Creek; *Inside Foreman*, W. E. Hendren, Coal Creek.

This is a Class A drift mine. It is located in Cumberland Mountain, 1,024 feet above sea level, 3 miles from Coal Creek, and connects with the Southern Railroad. The Coal Creek seam is worked. It has an average thickness of 44 inches. It is developed on the double entry, room and pillar system. Ventilation is produced by a fan 20 feet in diameter, and it is distributed as a continuous current. The coal is gathered at faces and hauled to motor sidetrack, a distance of from 1,000 to 4,000 feet, by motors; and from motor sidetrack to Bull-wheel sidetrack, a distance of 5,000 feet by tram motor; and from Bull-wheel to tippie, a distance of 4,000 feet, by tail rope.

This mine is using steam in intake air for humidifying same with good results.

Inspections made January 17, March 16, July 16, September 25, December 20.

ANDERSON COUNTY.

Black Diamond No. 5 Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Black Diamond Coal Co., Knoxville; *President and General Manager*, J. C. Luttrell, Knoxville; *Superintendent*, L. F. Card, Coal Creek; *Inside Foreman*, John Sharp, Coal Creek.

This is a Class A slope mine. It is located in the Cumberland Mountain, 1,029 feet above sea level, 3 miles from Coal Creek. It connects with the Southern Railroad. The Coal Creek seam, having an average thickness of 44 inches, is worked. The roof is slate and the bottom is slate and fire-clay. It is developed on the thribble main, and double cross entry, room and pillar system. It is ventilated by a fan which has a diameter of 10 feet, and the ventilation is distributed by the split system. Haulage is conducted from rooms to sidetrack, a distance of 1,400 feet, by mules; and from sidetrack to tippie, a distance of 5,800 feet, by tail rope.

This mine is using steam in the intake air for humidifying same which is giving good results.

Inspections made January 18, March 19, July 17, September 24.

ANDERSON COUNTY.

Brookside Mine—*Owner*, Royal Coal & Coke Co., Pless; *Operator*, Royal Coal & Coke Co., Pless; *President and General Manager*, H. S. Pless, Pless; *Superintendent*, J. W. Goans, Pless; *Inside Foreman*, J. M. Stonecipher, Pless.

This is a Class A drift mine. It is located in Cumberland Mountain, 1,000 feet above sea level, $\frac{1}{2}$ mile from Pless. It connects with the Southern Railroad. The Coal Creek seam is worked. It has an average thickness of 50 inches. Both roof and bottom is slate. It is developed on the double entry system. Ventilation is produced by a fan 10 feet in diameter, and is distributed by continuous current. Haulage is conducted from faces to tippie, a distance of 1,200 feet, by mules.

This mine is practically worked out.

ANDERSON COUNTY.

Buck Mountain Mine—*Owner*, Royal Coal & Coke Co., Pless; *Operator*, Royal Coal & Coke Co., Pless; *President and General Manager*, H. S. Pless, Pless; *Superintendent*, J. W. Goans, Pless; *Inside Foreman*, J. W. Stonecipher, Pless.

This is a Class A drift mine. It is located in Cumberland Mountain, 1,000 feet above sea level, $\frac{3}{4}$ mile from Pless. It connects with the Southern Railroad. The Coal Creek seam is worked, which has an average thickness of 50 inches. The roof is slate and clay, and the bottom is slate. Ventilation is produced by a fan 10 feet in diameter, and is distributed by the continuous current system. It is developed on the double entry system. Haulage is conducted from headings to sidetrack, a distance of 1,000 feet, by mules; from sidetrack to outside, a distance of 2,000 feet, by rope; from outside to tippie, a distance of 400 feet, by motor.

Inspections made January 12, March 20, June 15, August 26, October 24, December 19.

ANDERSON COUNTY.

Cross Mountain No. 1 Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Knoxville Iron Co., Knoxville; *President and General Manager*, T. I. Stephenson, Knoxville; *Superintendent*, P. F. Lynch, Briceville; *Inside Foreman*, George Bulmer, Briceville.

This is a Class A drift mine. It is located in the Cumberland Mountain, 1,006 feet above sea level, 4 miles from Coal Creek. It connects with the Southern Railroad. The Coal Creek seam, with an average thickness of 46 inches, is worked. The roof is slate and the bottom is fire-clay. It is developed on the entry and airway and double room system; is ventilated with an electric fan 7 feet in diameter, also a temporary disc fan run by steam; ventilation is distributed by the split system. Haulage is conducted from faces to sidetrack, a distance of from 1,500 to 3,000 feet, by motors and mules; from sidetrack to tippie, a distance of 7,000 feet, by tram motors.

This mine, which is naturally dry, is moistened by a system of pipe lines under pressure extending to the working faces, with hose for sprinkling. Both exhaust and live steam is also used in the intake air for humidifying with good results.

Inspections made March 21, June 14, August 21, October 22.

ANDERSON COUNTY.

Cross Mountain No. 3 Mine—*Owner*, Coal Creek Mining and Mfg. Co., Knoxville; *Operator*, Knoxville Iron Co., Knoxville; *President and General Manager*, T. I. Stephenson, Knoxville; *Superintendent*, P. F. Lynch, Briceville; *Inside Foreman*, John Jeffrey, Briceville.

This is a Class C drift mine. It is located in the Cumberland Mountain, 1,006 feet above sea level, 4 miles from Coal Creek. It connects with the Southern Railroad. The Coal Creek seam is worked. It has an average thickness of 48 inches. The roof is slate and the bottom is fire-clay. It is developed on the entry and airway and single room system. It is ventilated by a furnace, with a grate area of 60 feet, and the ventilation is distributed by the split system. Haulage is conducted from faces to tippie, a distance of 2,500 feet, by mules.

Inspections made January 1, June 14.

ANDERSON COUNTY.

Fraterville Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Coal Creek Coal Co., Knoxville; *President*, E. C. Camp, Knoxville; *General Manager*, G. M. Camp, Knoxville; *Superintendent*, W. H. Branscom, Coal Creek; *Inside Foreman*, J. L. Jones, Coal Creek.

This is a Class B drift mine. It is located in the Cumberland Mountain, 961 feet above sea level, 2 miles from Coal Creek. It connects with the Southern Railroad. The Coal Creek seam, with an average thickness of 48 inches, is worked. The roof is slate and the bottom is fire-clay. It is developed on the single entry and room system and is ventilated by a Crawford & McCrimmon fan, 16 feet in diameter. The ventilation is distributed by the split system. Haulage is conducted from faces to sidetrack, a distance of 3,800 feet, by mules; from sidetrack to tippie, a distance of 5,350 feet, by rope.

Inspections made January 16, March 22, June 28, September 30, December 12.

ANDERSON COUNTY.

Middle Ridge Mine—*Owner*, Leath & Sawyer, Clinton; *Operator*, Tennessee Coal Co., Briceville; *President and General Manager*, Geo. P. Chandler, Knoxville; *Superintendent*, H. R. Smith, Briceville; *Inside Foreman*, Charles Probert, Briceville.

This is a Class C drift mine. It is located in Middle Ridge, a spur of Cumberland Mountain, $\frac{3}{4}$ mile from Briceville. The elevation is 975 feet above sea level. The Coal Creek seam, with an average thickness of 48 inches, is worked. The roof is slate and sandstone, and the bottom is slate and fire-clay. It is developed on the entry and airway, room and pillar system; has natural ventilation, there being numerous openings to outside. Haulage is conducted from rooms to drum, a distance of 1,000 feet, by mules; and from drum to tippie, a distance of 716 feet, by gravity incline.

ANDERSON COUNTY.

Piedmont No. 2 Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Piedmont Coal & Coke Co., Knoxville; *President, General Manager and Superintendent*, E. F. Buffat, Knoxville; *Inside Foreman*, G. B. Carden, Oliver Springs.

This is a Class A drift mine. It is located in the Cumberland Mountain, 1,100 feet above sea level, 3 miles from Oliver Springs. It connects with the Louisville & Nashville Railroad. The Coal Creek seam, with an average thickness of 46 inches, is worked. The roof is slate and the bottom is fire-clay. It is developed on the entry and airway, room and pillar system. Ventilation is produced by a fan 7 feet in diameter, and is distributed by the split system. Haulage is conducted from faces to sidetrack, a distance of from 1,000 to 2,000 feet, by mules; from sidetrack to tippie, a distance of 5,000 feet, by rope.

Inspection made August 2.

ANDERSON COUNTY.

Piedmont No. 4 Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Piedmont Coal & Coke Co., Knoxville; *President, General Manager and Superintendent*, E. F. Buffat, Knoxville; *Inside Foreman*, G. B. Carden, Oliver Springs.

This is a Class B mine. It is located in the Cumberland Mountain, 3 miles from Oliver Springs. It connects with the Louisville & Nashville Railroad. The elevation is 1,100 feet above sea level. The Coal Creek seam is worked; it has an average thickness of 45 inches. The roof is slate and the bottom is fire-clay. It is developed on the single entry system. Ventilation is produced by furnace with a grate area of 36 feet, and is distributed by the split system. Haulage is conducted from mine to knuckle, a distance of 4,000 feet, by mules; and from knuckle to tippie a distance of 300 feet, by gravity. This mine is not in operation this year.

ANDERSON COUNTY.

Taft Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Coal Creek Coal Co., Knoxville; *President*, H. W. Camp, Knoxville; *General Manager*, G. M. Camp, Knoxville; *Superintendent*, W. H. Branscom, Coal Creek; *Inside Foreman*, W. H. Branscom, Coal Creek.

This is a Class C drift mine. It is located in the Cumberland Mountain, 990 feet above sea level, $2\frac{1}{2}$ miles from Coal Creek. It connects with the Southern Railroad. The Coal Creek seam is worked, and has an average thickness of 72 inches. The roof is slate and the bottom is slate and fire-clay. It is developed on the single entry and room system, and has natural ventilation. Haulage is conducted from rooms to tippie, a distance of 1,100 feet, by mules.

Inspection made July 16.

ANDERSON COUNTY.

Tennessee Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Tennessee Coal Co., Briceville; *President and General Manager*, Geo. P. Chandler, Knoxville; *Superintendent*, H. R. Smith, Briceville; *Inside Foreman*, E. M. Taylor, Briceville.

This is a Class A drift mine. It is located in the Cumberland Mountain, 972 feet

above sea level, 1 mile from Briceville. It connects with the Southern Railroad. The Coal Creek seam is worked, with an average thickness of 48 inches. The roof is slate and shale, and the bottom is fire-clay and slate. It is developed on the double entry, room and pillar system. It is ventilated by a fan, 16 feet in diameter, and is distributed by the split system. Haulage is conducted from faces to sidetrack, a distance of from 1,000 to 2,000 feet, by mules, and gathering motors; and from sidetrack to tipple, a distance of 9,000 feet, by motors.

This mine has installed waterworks for spraying and keeping same in a moist condition; they are also using the Buffat automatic force spray car for washing the dust off top, ribs, etc., which is giving good results.

Inspections made January 2, March 20, June 27, August 20, October 24, December 18.

ANDERSON COUNTY.

Thistle Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Coal Creek Coal Co., Knoxville; *President*, E. C. Camp, Knoxville; *General Manager*, G. M. Camp, Knoxville; *Superintendent*, W. H. Branscom, Coal Creek; *Inside Foreman*, D. B. Hutson, Coal Creek.

This is a Class B drift mine. It is located in the Cumberland Mountain, 1,011 feet above sea level, 3 miles from Coal Creek. It connects with the Southern Railroad. The Coal Creek seam, with an average thickness of 48 inches, is worked. The roof is slate and the bottom is fire-clay and slate. It is developed on the entry and room system. Ventilation is produced by a Crawford & McCrimmon fan, 16 feet in diameter, and is distributed by the split system. Haulage is conducted from rooms to sidetrack, a distance of 4,000 feet, by mules; and then from sidetrack to chute, a distance of 5,212 feet, by mules.

Inspections made January 15, March 22, June 27, August 22, October 29, December 11.

ANDERSON COUNTY.

Wind Rock No. 1 Mine—*Owner*, Bessemer Coal, Iron & Land Co., Birmingham, Ala.; *Operator*, Wind Rock Coal Co., Windrock; *President and General Manager*, H. L. Badham, Birmingham, Ala.; *Superintendent*, W. G. Srodes, Wind Rock; *Inside Foreman*, Tom Doyle, Wind Rock.

This is a Class B drift mine. It is located in Cumberland Mountain, 2,400 feet above sea level, 3 miles from Oliver Springs. It connects with the Louisville & Nashville Railroad. The Dean seam is worked. It has an average thickness of 56 inches. The roof is sandstone and the bottom fire-clay. It is developed on the double entry, room and pillar system. It is ventilated by fan, 6 feet in diameter, and the ventilation is distributed by the split system. Haulage is conducted from faces to tipple, a distance of 6,000 feet, by motor; from tipple to chute at railroad, a distance of 4,500 feet, by monitor.

This mine is turning steam in intake air, for humidifying same; also using force sprays for washing ribs, tops, etc.

Inspections made January 26, March 26, June 12, August 16, October 18.

BLED SOE COUNTY.

Atpontly No. 6 Mine—*Owner*, Atpontly Coal Co., Chattanooga; *Operator*, Polk Creek Coal Co., Chattanooga; *Inside Foreman* (first part of the year), Robert Hoge, Atpontly; (latter part of the year), W. G. Lusk, Atpontly.

This mine is located in Cumberland Mountain, on the west side of Sequatchie Valley, $\frac{3}{4}$ of a mile west of Atpontly, and 1,500 feet above sea level. It is a Class C drift mine, opened up in the Sewanee seam, which has at this point an average thickness of 3 feet. The roof is slate and the bottom fire-clay. The seam is very irregular in formation, rolls occurring at frequent intervals, confining the coal in most sections to pockets. The coal is of a faulty nature, and the bottom part is very dirty. Generally, this is a damp or moist mine, and the coal being of a soft nature, is shot principally from the solid, the explosive used being black powder. Ventilation is furnished by a 6-foot home-made disc fan, with steam connection. The ventilating current is conducted through the mine, by means of doors and wooden stoppings, as a continuous current, and is generally not well distributed in working faces. An average of 24 men

and 6 mules are employed on the inside work. Haulage is conducted from rooms to head of short incline on the outside by mules, then lowered down this incline in mine cars, a distance of 400 feet, to head of main incline, by small gravity drum, from head of main incline to tippie, a distance of 4,004 feet, by drum and rope; and from tippie to College Station on Nashville, Chattanooga & St. Louis Railroad, a distance of 3 miles, by locomotives.

Inspections made January 22, April 23 and November 11.

CAMPBELL COUNTY.

The Anchor Mine—*Owner*, J. F. Hefferman, Jellico; *Operator*, The Anchor Coal Co., Morley; *President and General Manager*, J. D. Raht, Knoxville; *Superintendent*, H. D. Rankin, Morley; *Inside Foreman*, J. H. Richards, Morley.

This is a Class C drift mine. It is located in White Oak Mountain, $\frac{3}{4}$ miles from Morley, 1,373 feet above sea level. This mine connects with the L. & N. Railroad. The White Oak seams, No. 1 and No. 2, with average thickness of 72 inches, are worked. Both the roof and the bottom are slate. It is developed on the double entry system. It is ventilated by two fans, 8 feet in diameter. The ventilation is distributed by the continuous current system. Haulage is conducted from face to knuckle, a maximum distance of 4,000 feet, by mules; from knuckle to tippie, a distance of 600 feet, by gravity incline. This mine was idle most of the year.

Inspection made March 13.

CAMPBELL COUNTY.

Baird B. G. Mine—*Owner*, Lewis Baird, Elk Valley; *Operator*, Lewis Baird, Elk Valley; *President, General Manager and Superintendent*, Lewis Baird, Elk Valley; *Inside Foreman*, Aaron Baird, Elk Valley.

This is a Class C drift mine. It is located in Jellico Mountain, 1 mile from Elk Valley. The elevation is 1,250 feet above sea level. It connects with the Southern Railroad. The Blue Gem seam is worked; its average thickness is 20 inches. The roof is sandstone and slate, and the bottom is slate. It is developed on the room and pillar system. Ventilation is produced by an air shaft. Haulage is conducted from entry to cars by mules, then it is conveyed by tramway.

Inspection made February 29.

CAMPBELL COUNTY.

Bear Wallow Mine—*Owner*, Lindsay Land Co., Knoxville; *Operator*, Bear Wallow Coal Co., Caryville; *President and General Manager*, John L. Boyd, Knoxville; *Superintendent*, A. H. Bowling, Caryville; *Inside Foreman*, S. P. Loggin, Caryville.

This is a Class A slope mine. It is located in the Cumberland Mountain, $\frac{1}{2}$ mile from Caryville. The elevation is 1,050 feet above sea level. This mine connects with the Southern Railroad. The Coal Creek seam, with an average thickness of 38 inches, is worked. The roof is slate and sandstone and the bottom is slate. It is developed on the entry and airway system, and is ventilated by a fan 6 feet in diameter, the ventilation being distributed by the continuous current system. Haulage is conducted from heading to bottom of slope, a distance of from 2,000 to 3,000 feet, by motor; and from bottom of slope to top of trestle, a distance of 250 feet, by automatic chain hoist.

Inspections made January 22, March 16, May 30, August 19, October 15, December 17.

CAMPBELL COUNTY.

Block No. 2 Mine—*Owner*, Block Coal & Coke Co., Block; *Operator*, Block Coal & Coke Co., Block; *President and General Manager*, Robert Wedekind, Louisville, Ky.; *Superintendent*, John Gorman, Block; *Inside Foreman*, M. K. Marlow, Block.

This is a Class C drift mine. It is located in Cross Mountain, 2,600 feet above sea level, 1 mile from Block. It connects with the Southern Railroad. The Red Ash seam is worked; the average thickness is 36 inches. The top is slate and the bottom is clay. It is developed on the single entry system. Ventilation is by natural means. Cars are trammed from faces to tippie by hand and dumped into chutes at Monarch incline, which delivers coal to railroad cars.

Inspection made September 5.

CAMPBELL COUNTY.

Block Monarch Mine—*Owner*, East Tennessee Coal & Coke Co., Knoxville; *Operator*, Block Coal Co., Block; *President*, Robert Wedekind, Louisville, Ky.; *General Manager*, L. I. Coleman, Knoxville; *Superintendent*, J. P. Gorman, Jellico; *Inside Foreman*, M. K. Marlow, Block.

This is a Class C drift mine. It is located in Cross Mountain, 2,700 feet above sea level, at Block. It connects with the Southern Railroad. The Monarch seam is worked. It has an average thickness of 66 inches. The top is slate, and the bottom is slate. It is developed on the double entry system. Ventilation is produced by a fan 4 feet in diameter, and is distributed by the continuous current system. Haulage is conducted from faces to top of incline, a distance of from 2,000 to 3,000 feet, by mules; from top of incline to tippie, a distance of 4,700 feet, by gravity in monitor cars.

Inspections made March 6, June 18, September 5.

CAMPBELL COUNTY.

Blue Gem Mine—*Owner*, Blue Gem Coal Co., Jellico; *Operator*, Blue Gem Coal Co., Jellico; *President and General Manager*, J. E. Moses, Louisville, Ky.; *Superintendent*, Jas. F. McPherson, Jellico; *Inside Foreman*, James Haywood, Jellico.

This is a Class B drift mine. It is situated in Pine Mountain, 1 mile from Jellico. The elevation is 1,000 feet above sea level. It connects with the Southern Railroad. The Blue Gem seam is worked. It has an average thickness of 24 inches. The roof is slate, and the bottom is fire-clay. It is developed on the room and pillar system. This mine is ventilated by a furnace with a 4½x10-foot grate. Haulage is conducted from entries to knuckle, a distance of from 1,500 to 2,400 feet, by mules.

Inspections made February 14, May 8, August 12.

CAMPBELL COUNTY.

Cambria Mine—*Owner*, The Royal Coal & Coke Co., Knoxville; *Operator*, The Royal Coal & Coke Co., Knoxville; *President and General Manager*, H. S. Pless, Pless; *Superintendent*, W. A. Pless, Coal Creek; *Inside Foreman*, Charles Bell, Coal Creek.

This is a Class A drift mine. It is located in the Cumberland Mountain, 1,136 feet above sea level, 3 miles from Coal Creek. It connects with the Southern Railroad. The Coal Creek seam is worked. It has an average thickness of 40 inches. The roof is fire-clay and slate, and the bottom is fire-clay. It is developed on the double entry, room and pillar system. Ventilation is produced by a fan of 20 feet, and is distributed by the split system. Haulage is conducted from rooms to sidetrack, a distance of 2,500 feet, by mules; and from sidetrack to chute, a distance of 4,200 feet, by rope.

Inspections made January 19, March 14, June 19, August 22, October 23, December 16.

CAMPBELL COUNTY.

Caryville Mine—*Owner*, Caryville Coal Co., Caryville; *Operator*, Caryville Coal Co., Caryville; *President*, Thos. H. Gill, Milwaukee, Wis.; *General Manager and Superintendent*, J. H. McManaman, Caryville; *Inside Foreman*, J. W. Duncan, Caryville.

This is a Class C drift mine. It is located in Cumberland Mountain, 2 miles from Caryville. The elevation is 2,445 feet above sea level. It connects with the Southern Railroad. The Red Ash seam, with an average thickness of 42 inches, is worked. Both the roof and the bottom are slate. This mine is developed on the room and pillar system. It is ventilated by a fan 8 feet in diameter, and the ventilation is distributed by the continuous current system. Haulage is conducted from headings to sidetrack, a distance of from 300 to 2,400 feet, by mules; from sidetrack to tippie by rope, the distance being 2,000 feet.

Inspections made March 5, June 17, August 27, November 6.

CAMPBELL COUNTY.

Chaska Mine—*Owner*, Chaska Coal Co., Knoxville and Chaska; *Operator*, Chaska Coal Co., Knoxville and Chaska; *President and General Manager*, F. B. Cooley, Sr.,

Knoxville and Chaska; *Superintendent*, W. M. Sexton, Knoxville and Chaska; *Inside Foreman*, J. W. Payne, Chaska.

This is a Class C drift mine. It is located in a spur of Rich Mountain, 1 mile from Chaska. Its elevation is 1,400 feet above sea level. It connects with the Louisville and Nashville Railroad. The Rich Mountain seam is worked. It has an average thickness of 40 inches. The roof is composed of fire-clay and soapstone, and the bottom is fire-clay. It is developed on the single entry system. It is ventilated by a furnace with a grate area of 25 square feet. The ventilation is distributed by the continuous current system. Haulage is conducted from mine to knuckle by motor, the distance being 4,400 feet; from rooms to motor siding, a distance of 1,000 feet, by mules; from knuckle to tip houses, by incline, the distance being 750 feet.

Inspections made March 13, June 20, September 3.

CAMPBELL COUNTY.

Davis Creek No. 1 Mine—*Owner*, Lafollette Coal, Iron & Railway Co., Lafollette; *Operator*, Fresno Coal Co., Cupp; *President and General Manager*, John Frola, Cupp; *Superintendent*, Bert Facinoli, Cupp; *Inside Foreman*, Alex. Ross, Cupp.

This is a Class C drift mine. It is located in Cumberland Mountain, 1,975 feet above sea level, $\frac{1}{2}$ mile from Cupp. It connects with the Louisville and Nashville Railroad. The Rich Mountain or Remy seam is worked. It has an average thickness of 34 inches. The roof is slate, and the bottom is fire-clay. It is developed on the single entry system. It is ventilated by a furnace with a grate area of 25 feet. The ventilation is distributed by the continuous current system. Haulage is conducted from face to knuckle, a distance of from 1,000 to 1,800 feet, by mules; from knuckle to tippie, a distance of 200 feet, by gravity.

CAMPBELL COUNTY.

Davis Creek No. 2 Mine—*Owner*, G. W. Parrott, Atlanta, Ga.; *Operator*, Davis Creek Coal Co., Cupp; *President and General Manager*, John Frola, Cupp; *Superintendent*, Bert Facinoli, Cupp; *Inside Foreman*, Sam Gray, Cupp.

This is a Class D drift mine. It is located in Rich Mountain, 1,975 feet above sea level, $\frac{1}{2}$ mile from Cupp. It connects with the Louisville and Nashville Railroad. The Rich Mountain or Remy seam is worked. It has an average thickness of 32 inches. The roof is slate, and the bottom is fire-clay. It is developed on the single entry system. It is ventilated by a furnace with a grate area of 25 feet. The ventilation is distributed by the continuous current system. Haulage is conducted from rooms to knuckle I, a distance of 1,000 feet, by mules; from knuckle I to bottom of incline, a distance of 800 feet, by gravity; from knuckle II to chute, a distance of 100 feet, by gravity.

CAMPBELL COUNTY.

Elk Valley Mine—*Owner*, Elk Valley Coal & Iron Co., Jacksboro; *Operator*, Elk Valley Jellico Coal Co., Jacksboro; *President and General Manager*, J. M. Biber, Jacksboro; *Superintendent*, D. W. Parrott, Jacksboro; *Inside Foreman*, E. L. Robinson, Jacksboro.

This is a Class C drift mine. It is located in Jellico Mountain, 2 miles from Elk Valley. The elevation is 1,600 feet above sea level. This mine connects with the Southern Railroad. The Splint seam is worked. It has an average thickness of 36 inches. The roof is composed of slate, and the bottom of fire-clay. This mine is developed on the room and pillar system. It is ventilated by a furnace with 15 feet grate area. Haulage is conducted from rooms to outside by mules; from splint to tippie, a distance of 8,000 feet, haulage is conducted by locomotive. Four Ingersoll mining machines are used in this mine.

Inspection made February 29.

CAMPBELL COUNTY.

Evans Mine—*Owner*, Evans Coal Co., Jellico; *Operator*, Evans Coal Co., Jellico; *President, General Manager, Superintendent and Inside Foreman*, P. F. Gorman.

This is a Class C drift mine. This mine is located $1\frac{1}{2}$ miles from Jellico, on the Southern Railroad. The Blue Gem seam is worked, and has an average thickness of 24 inches. The roof is slate, and the bottom is slate. The mine is developed on the single entry system. It is ventilated by a furnace with a grate area of 24 feet. Haulage is conducted from face to knuckle, a distance of 3,500 feet, by mules; from knuckle to railroad, a distance of 300 feet, by incline.

Inspections made February 20, May 13, August 12.

CAMPBELL COUNTY.

Falls Branch Mine—*Owner*, Falls Branch Coal Co., Wooldridge; *Operator*, Falls Branch Coal Co., Wooldridge; *President and General Manager*, P. Wooldridge, Pewee Valley, Ky.; *Superintendent*, Wm. Dinkleraker, Wooldridge; *Inside Foreman*, J. W. Howe, Wooldridge.

This is a Class C drift mine. It is located in Jellico Mountain, 2 miles from Wooldridge. The elevation is 1,250 feet above sea level. This mine connects with the Southern Railroad. The Jellico seam is worked. It has an average thickness of 40 inches. The roof is slate, and the bottom is fire-clay. The single and double entry system is used in its development. Ventilation is produced by a fan with a diameter of 8 feet, and the ventilation is distributed by the split system. Haulage is conducted from rooms to No. 3 sidetrack by mules, the distance being 1,500 feet; from No. 3 sidetrack to No. 2 sidetrack, a distance of 1,900 feet, by gas motor; from No. 2 sidetrack to outside by steam locomotive, the distance being 2,500 feet; from entrance to knuckle, a distance of 10,560 feet, by steam locomotive; from knuckle to tippie, a distance of 1,000 feet, by gravity incline.

Inspections made February 16, May 9, July 31.

CAMPBELL COUNTY.

Gem Mine—*Owner*, Lafollette Coal, Iron & Railway Co., Lafollette; *Operator*, Lafollette Coal, Iron & Railway Co., Lafollette; *President and General Manager*, H. M. Lafollette, Lafollette; *Superintendent*, W. S. Wilson, Lafollette; *Inside Foreman*, H. D. Hufstetter, Lafollette.

This is a Class C drift mine. It is located in Rock Creek Mountain, $\frac{3}{4}$ mile from Peabody. Its elevation is 1,986 feet above sea level. It connects with the Louisville and Nashville Railroad. The Jordan seam is worked. It has an average thickness of 50 inches. The roof is slate, and the bottom is fire-clay. It is developed on the double entry, room and pillar system. Ventilation is produced by fan and furnace. The fan is 6 feet in diameter, and the furnace has a grate area of 48 feet. It is distributed by the split system. Haulage is conducted from face to incline, a distance of 6,600 feet, by electric motors; from top of incline to tippie, a distance of 4,000 feet, by endless rope.

Inspections made March 29, June 24, September 2.

CAMPBELL COUNTY.

Indian Mountain Mine—*Owner*, East Tennessee Coal Co., Knoxville; *Operator*, Proctor Coal Co., Red Ash, Ky.; *President and General Manager*, Charles Finley, Williamsburg, Ky.; *Superintendent*, Phillip Francis, Jellico; *Inside Foreman*, J. P. Alred, Red Ash, Ky.

This is a Class C drift mine, located 1,300 feet above sea level, in Indian Mountain, $2\frac{1}{2}$ miles from Jellico, and connects with the Louisville and Nashville and Southern Railroads. The Jellico seam is worked. It has an average thickness of 40 inches. The roof is slate, and the bottom is fire-clay. It is developed on the single entry system. Ventilation is produced by a fan 11 feet in diameter, and is distributed by the split system. Haulage is conducted from faces to sidetrack, a distance of from 1,000 to 1,500 feet, by mules; and from sidetrack to top of incline, a distance of from 2,500 to 3,500 feet, by motors; and from top of incline to tippie, a distance of 1,000 feet, by gravity incline.

Inspections made March 21, May 14, July 29.

CAMPBELL COUNTY.

Italian Blue Gem Mine—*Owner*, Italian Blue Gem Coal Co., Newcomb; *Operator*, Zechini Coal Co., Newcomb; *President, General Manager and Superintendent*, Peter Zechini, Newcomb; *Inside Foreman*, W. A. Braden, Newcomb.

This is a Class C drift mine. It is located in Pine Mountain, 2 miles from Newcomb. Its elevation is 1,200 feet above sea level. The Blue Gem seam, with an average thickness of 22 inches, is worked. The roof is slate, and the bottom is slate and fire-clay. It is developed on the single entry and double room system. Ventilation is produced by a fan 4 feet in diameter, and is distributed by the airway system. Haulage is conducted from room to drum, a distance of 4,000 feet, by mules; from drum to chute and railroad, a distance of 1,150 feet, by gravity.

Inspections made February 22, July 30.

CAMPBELL COUNTY.

Jackson Mine—*Owner*, Campbell Coal Mining Co., Westbourne; *Operator*, Campbell Coal Mining Co., Westbourne; *President*, Alex. Bonamon, Atlanta, Ga.; *General Manager*, Joseph Richards, Oliver Springs; *Superintendent*, David Watkins, Westbourne; *Inside Foreman*, Richard Rigby, Westbourne.

This is a Class C drift mine. It is located in Rich Mountain, $\frac{1}{2}$ mile from Westbourne. The elevation is 1,100 feet above sea level. It connects with the Southern Railroad. The Log Mountain seam is worked. It has an average thickness of 48 inches. The roof is composed of sandstone and slate, and the bottom of fire-clay and slate. This mine is developed on the room and pillar system. Ventilation is furnished by a furnace which has a grate area of 64 feet. Haulage is conducted from working faces to sidetrack by mules, the distance being 1,000 feet; from sidetrack to knuckle, a distance of 1,500 feet, by motor; from knuckle to railroad, a distance of 800 feet, by gravity incline.

Inspections made March 8, June 26.

CAMPBELL COUNTY.

Jellico B. G. Mine—*Owner*, E. Jameson-Jones Co., Jellico; *Operator*, H. M. Jones Coal Co., Jellico; *President and General Manager*, J. S. Jones, Jellico; *Superintendent*, H. M. Jones, Jellico; *Inside Foreman*, H. M. Jones, Jellico.

This is a Class B drift mine. It is located in Pine Mountain, 2 miles from Jellico. Its elevation is 1,200 feet above sea level. It connects with the Southern Railroad. The Blue Gem seam is worked. It has an average thickness of 24 inches. The roof is slate, and the bottom is slate and fire-clay. It is developed on the single entry and airway system. Ventilation is produced by a furnace with a 6x8 grate area, and is distributed by the break-through system. Haulage is conducted from faces to outside, a distance of 400 feet, by mules; from outside to knuckle, a distance of 4,000 feet, by steam locomotive; from knuckle to tippie, a distance of 1,400 feet, by gravity.

Inspections made February 20, May 14, August 13.

CAMPBELL COUNTY.

Jellico Cannel Mine—*Owner*, Jellico Cannel Co., Newcomb; *Operator*, Jellico Cannel Co., Newcomb; *President and General Manager*, Thos. N. Mordue, Chicago, Ill.; *Superintendent and Inside Foreman*, W. H. Buck, Newcomb.

This is a Class C drift mine. It is situated 2 miles from Newcomb, on the Southern Railroad. The Cannel seam, with an average thickness of 30 inches, is worked. It is developed on the single entry and airway plan. The elevation of the seam is 1,800 feet above sea level. The roof is slate, and the bottom is slate. Ventilation is produced by a fan 4 feet in diameter, and is distributed by the continuous current system. Haulage is conducted from faces to upper knuckle, a distance of 2,800 feet, by mules; then it is lowered to Jellico level by plane 1,300 feet long; then it is trammed to lower knuckle, 4,000 feet, when the mine cars are lowered by incline 1,000 feet to tippie and cars.

Inspections made February 22, May 15, July 30.

CAMPBELL COUNTY.

Kimberly Mine—*Owner*, Kimberly Mining & Mfg. Co., Cupp; *Operator*, Kimberly Mining & Mfg. Co., Cupp; *President and General Manager*, Geo. P. Chandler, Knoxville; *Superintendent*, C. R. Brooks, Cupp; *Inside Foreman*, J. F. Hendren, Cupp.

This is a Class C drift mine. It is located in the Cumberland Mountain, 1,555 feet above sea level. It connects with the Louisville & Nashville Railroad. The Rich Mountain seam is worked. It has an average thickness of 40 inches. The roof is slate and sandstone, and the bottom is clay. The mine is developed on the entry and airway system. Ventilation is produced by a fan 6 feet in diameter, and is distributed by the split current system. Mining is done by electricity, and haulage is conducted from faces to tippie, a distance of 4,000 feet, by motors; from main heading to knuckle, a distance of 4,750 feet, by motors; then the mine cars are lowered by incline 750 feet to tippie at railroad.

Inspections made March 12, June 20, September 3.

CAMPBELL COUNTY.

Marion-Anna Mine—*Owner*, Wooldridge Jellico Coal Co., Wooldridge; *Operator*, Wooldridge Jellico Coal Co., Wooldridge; *President and General Manager*, P. Wooldridge, Pewee Valley, Ky.; *Superintendent*, Wm. Dinkerlaker, Wooldridge; *Inside Foreman*, Thos. H. Griffith, Wooldridge.

This is a Class C drift mine. It is located in Jellico Mountain, 1,225 feet above sea level, $2\frac{1}{2}$ miles from Newcomb. It connects with the Southern Railroad. The Jellico seam is worked. It has an average thickness of 36 inches. The roof is slate, and the bottom is fire-clay. It is developed on the single entry and double room system. Ventilation is produced by a fan 8 feet in diameter, and is distributed by the direct current system. Haulage is conducted from rooms to right sidetrack, a distance of 500 feet, by mules; from right sidetrack to general sidetrack, a distance of 2,000 feet, by motor; from sidetrack to knuckle, a distance of 300 feet, by mules.

Inspections made February 15, May 9.

CAMPBELL COUNTY.

Morley Mine—*Owner and Operator*, Morley Coal Co., Knoxville; *President and General Manager*, W. E. Park, Knoxville; *Secretary*, J. M. Hartman, Knoxville; *Superintendent*, J. C. Kranz, Knoxville; *Inside Foreman*, Geo. Easler, Morley.

This is a Class C drift mine, located 1,300 feet above sea level, in Cumberland Mountain, $3\frac{1}{2}$ miles from Jellico, and connects with the Louisville and Nashville Railroad. The Kramor seam, having an average thickness of 34 inches, is worked. The roof is slate, and the bottom is clay. It is developed on the single entry, room and pillar system. Ventilation is produced by furnace with a grate area of 32 feet, and is distributed as continuous current. Haulage is conducted from rooms to entrance, a distance of 600 feet, by mules; and from entrance to tippie, a distance of 800 feet, by incline. This mine was not in active operation during the years 1911 and 1912.

CAMPBELL COUNTY.

Newcomb Blue Gem Mine—*Owner, Operator, Superintendent, etc.*, I. L. Wilson, Newcomb.

This is a Class E drift mine. It is located 1,200 feet above sea level, in Long Mountain, $\frac{1}{2}$ mile from Newcomb. It connects by wagon haul with Southern Railroad. The Blue Gem seam is worked. It has an average thickness of 26 inches. The roof is slate, and the bottom is slate and sand mixture. It is developed on the double entry system, and is connected with old works. It has natural ventilation. Haulage is conducted from inside to tippie, a distance of 575 feet, by mules.

CAMPBELL COUNTY.

New Royal Mine—*Owner*, Royal Coal & Coke Co., Knoxville; *Operator*, Royal Coal & Coke Co., Knoxville; *President and General Manager*, H. S. Pless, Pless; *Superintendent*, W. A. Pless, Coal Creek; *Inside Foreman*, Charles Bell, Coal Creek.

This is a Class B drift mine. It is located 3 miles from Coal Creek, and is connected with the Southern Railroad. The Coal Creek seam is worked, one main entry driven to mine coal between the old Royal mine and the crop. The average thickness of the seam is 42 inches. The roof is slate mixed with clay, and the bottom is slate. Haulage is conducted from entrance of mine to top of incline by mules. From incline to tipple is a distance of 200 feet.

CAMPBELL COUNTY.

Perkins Branch Mine—*Owner*, Perkins Branch Blue Gem Coal Co., Elk Valley; *Operator*, Perkins Branch Blue Gem Coal Co., Elk Valley; *President and General Manager*, M. L. Baird, Elk Valley; *Superintendent and Inside Foreman*, Ewel Baird, Elk Valley.

This is a Class C drift mine. It is situated 1½ miles from Elk Valley, on the Southern Railroad. The Blue Gem seam is worked. It has an average thickness of 22 inches. The top and bottom are both slate. This mine is developed on the single entry system. Ventilation is produced by a furnace, and is distributed as a continuous current system. Coal is hauled from face to chute by mules.

Inspection made February 29.

CAMPBELL COUNTY.

Pewee Mine—*Owner*, Sun Coal Co., Caryville; *Operator*, Sun Coal Co., Caryville; *President*, Peter Bauer, Beaver Dam, Wis.; *General Manager and Superintendent*, J. H. Bowling, Caryville; *Inside Foreman*, Warren Card, Caryville.

This is a Class C drift mine. It is located in Cumberland Mountain, 38 miles from Knoxville. The elevation is 2,479 feet above sea level. It connects with the Southern Railroad. The Dean seam, with an average thickness of 42 inches, is worked. Both roof and bottom are slate. It is developed on the double entry system. Ventilation is produced by a fan 4 feet in diameter, and is distributed by the continuous current system. Haulage is conducted from faces to knuckle, a distance of 1,400 feet, by mules; from knuckle to top of incline, a distance of 2,500 feet, by rope; from top of incline to tipple, a distance of 4,000 feet, by monitor.

Inspections made March 4, June 10, August 26.

CAMPBELL COUNTY.

Powhatan Mine—*Owner*, Falls Branch Coal Co., Wooldridge; *Operator*, Falls Branch Coal Co., Wooldridge; *President and General Manager*, P. Wooldridge, Pewee, Valley, Ky.; *Superintendent*, Wm. Dinkerlaker, Wooldridge; *Inside Foreman*, J. W. Howe, Wooldridge.

This is a Class C drift mine. It is located in Jellico Mountain, 1½ miles from Wooldridge. The elevation is 1,160 feet above sea level. This mine connects with the Southern Railroad. The Blue Gem seam is worked. It has an average thickness of 24 inches. The roof is slate, and the bottom is fire-clay. It is developed on the single entry system. Ventilation is produced by natural means. Haulage is conducted from rooms to knuckle by mules, the distance being 3,000 feet.

Inspections made February 16, July 31.

CAMPBELL COUNTY.

Red Ash Mine—*Owner*, East Tennessee Iron & Coal Co., Knoxville; *Operator*, Red Ash Coal Co., Caryville; *President and General Manager*, C. M. Moore, Caryville; *Superintendent*, T. D. Richards, Caryville; *Inside Foreman*, D. W. Steadman, Caryville.

This is a Class C drift mine. It is located in the Cumberland Mountain, 2,450 feet above sea level, 1 mile from Caryville. It connects with the Southern Railroad. The Red Ash seam is worked, and has an average thickness of 42 inches. The roof is slate, and the bottom is slate and fire-clay. It is developed on the double entry system. This mine is ventilated by a fan 4 feet in diameter, and the ventilation is distributed by the continuous current system. Haulage is conducted from face of entries to sidetrack, a distance of 2,500 feet, by electric motor; from sidetrack to tipple, a distance of 1,800 feet, by motor; from tipple to railroad, a distance of 6,200 feet, by monitor cars.

Inspections made March 5, June 11, August 27, November 6.

CAMPBELL COUNTY.

Remy Mine—*Owner*, Remy Coal Co., Gatliff; *Operator*, Remy Coal Co., Gatliff; *President, General Manager and Superintendent*, J. D. Wheeler, Gatliff; *Inside Foreman*, A. B. Lindsay, Gatliff.

This is a Class C drift mine. It is located in Log Mountain, 1,578 feet above sea level, $\frac{3}{4}$ mile from Gatliff. It connects with the Louisville and Nashville Railroad. The Rich Mountain seam is worked. It has an average thickness of 36 inches. The roof and bottom are slate. The double and single entry systems are used in the development of this mine. Ventilation is produced by a fan 4 feet in diameter, and is distributed by the airway and break-through system. Haulage is conducted from sidetrack No. 2 to sidetrack No. 1, a distance of 700 feet, by mules; from sidetrack No. 1 to knuckle, a distance of 1,000 feet, by mules; from knuckle to tippie, a distance of 900 feet, by incline.

Inspections made March 11, June 25, August 23.

CAMPBELL COUNTY.

Rex No. 1 Mine—*Owner*, Lafollette Coal, Iron & Railway Co., Lafollette; *Operator*, Lafollette Coal, Iron & Railway Co., Lafollette; *President and General Manager*, H. M. Lafollette, Lafollette; *Superintendent*, H. Bevin, Lafollette; *Inside Foreman*, Abe Goins, Lafollette.

This is a Class A slope mine, located 1,180 feet above sea level, in Cumberland Mountain, 1 mile from Lafollette. It connects with the Louisville and Nashville and Southern railroads. The Rex seam, having an average thickness of 40 inches, is worked. The roof is slate, and the bottom is slate and fire-clay. It is developed on the panel system. Ventilation is produced by a fan 12 feet in diameter, and is distributed by the split system. Haulage is conducted from face to sidetrack, a distance of 2,000 feet, by mules; from sidetrack to foot of slope, a distance of 2,700 feet, by gasoline motors; from foot of slope to tippie, a distance of 2,150 feet, by rope.

Inspections made January 23, March 21, June 7, August 15, October 10.

CAMPBELL COUNTY.

Rex No. 2 Mine—*Owner*, Lafollette Coal, Iron & Railway Co., Lafollette; *Operator*, Lafollette Coal, Iron & Railway Co., Lafollette; *President and General Manager*, H. M. Lafollette, Lafollette; *Superintendent*, Charles Hoebel, Lafollette; *Inside Foreman*, Charles Wood, Lafollette.

This is a Class A slope mine. It is located in the Cumberland Mountain, 1 mile from Lafollette. The elevation is 1,271 feet above sea level. It connects with the Louisville and Nashville and Southern railroads. The Rex seam is worked. It has an average thickness of 36 inches. The roof is slate, and the bottom is fire-clay and slate. It was developed on the room and pillar system, but is now developed on the panel system. Ventilation is produced by fans with diameters of 6 and 12 feet respectively. Haulage is conducted from faces to sidetrack, a distance of 1,500 feet, by mules; from sidetrack to foot of slope, a distance of 2,800 feet, by gasoline motor; from foot of slope to outside, a distance of 1,200 feet, by rope. The workings of Rex Nos. 1 and 2 are connected, although they are operated as separate mines.

Inspections made January 24, March 22, June 7, August 14, October 23, December 13.

CAMPBELL COUNTY.

Rich Mountain Mine—*Owner*, J. S. Bartlett and H. M. Lafollette, Lafollette; *Operator*, Rich Mountain Coal & Coke Co., Lafollette; *President and General Manager*, E. M. Beasley, Coal Creek; *Superintendent*, H. W. Tillery, Lafollette; *Inside Foreman*, W. S. Elliott, Coal Creek.

This is a Class A drift mine. It is located in Rich Mountain, 1,270 feet above sea level, 11 miles from Lafollette. It connects with the Louisville and Nashville Railroad. The Rich Mountain seam is worked. It has an average thickness of 34 inches. Both roof and bottom are slate. It is developed on the single entry system. Ventilation is produced by a fan 7 feet in diameter, and is distributed by the entries and return air

system. Haulage is conducted from rooms to sidetrack, a distance of 975 feet, by mules; from sidetrack to tippie, a distance of 5,250 feet, by rope.

Inspections made March 12, June 21, September 3.

CAMPBELL COUNTY.

Rock Spring Mine—*Owner*, East Tennessee Iron & Coal Co., Knoxville; *Operator*, Rock Springs Coal Co., Knoxville; *President and General Manager*, R. E. Miller, Atlanta, Ga.; *Superintendent*, G. W. Card, Turley; *Inside Foreman*, Paul Card, Turley.

This is a Class D drift mine. It is located in the Cumberland Mountain, 2,800 feet above sea level, $1\frac{1}{2}$ miles from Turley. It connects with the Southern Railroad. The Dean seam is worked. It has an average thickness of 52 inches. Both the roof and bottom are slate. It is developed on the room and pillar system. Ventilation is produced by a fan with a diameter of 8 feet, and is distributed by the split system. Haulage is conducted from headings to sidetrack, a distance of 1,200 feet, by motor; from mine to railroad, a distance of 5,600 feet, by gravity.

Inspections made March 6, June 18, September 5.

CAMPBELL COUNTY.

Southern Nos. 1 and 2 Mine—*Owner*, Southern Coal & Coke Co., Gatliff; *Operator*, Southern Coal & Coke Co., Gatliff; *President and General Manager*, Dr. A. Gatliff, Williamsburg, Ky.; *Superintendent*, A. V. Brown, Gatliff; *Inside Foreman*, G. W. Pickle, Gatliff.

This is a Class C drift mine. It is located in Brushy Mountain, 1,800 feet above sea level, $\frac{1}{2}$ mile from Gatliff. It connects with the Louisville and Nashville Railroad. The Jordan seam is worked. It has an average thickness of 54 inches. The roof is sandstone and shale, and the bottom is fire-clay. It is developed on the single entry and airway system. Ventilation is produced by a furnace with a grate area of 28 feet, and is distributed by direct current system. Haulage is conducted from rooms to southern main sidetrack, a distance of 1,300 feet, by mules; from southern main sidetrack to knuckle, a distance of 2,870 feet, by gasoline motor; from rooms to No. 3 sidetrack, a distance of 2,100 feet, by mules; from No. 3 sidetrack to knuckle, a distance of 1,300 feet, by gasoline motor; from knuckle to tippie, a distance of 1,200 feet, by incline.

Inspections made March 7, June 25, September 4.

CAMPBELL COUNTY.

Sun Mine—*Owner*, Sun Coal Co., Caryville; *Operator*, Sun Coal Co., Caryville; *President and General Manager*, Peter Bauer, Beaver Dam, Wis.; *Superintendent*, J. H. Bowling, Caryville; *Inside Foreman*, Warren Card, Caryville.

This is a Class C drift mine. It is located in Cumberland Mountain, 38 miles from Knoxville. The elevation is 2,429 feet above sea level. It connects with the Southern Railroad. The Block seam is worked. It has an average thickness of 42 inches. The roof is slate, and the bottom is shale. It is developed on the double entry, room and pillar system. Ventilation is produced by a fan 6 feet in diameter, and is distributed by the two returns system. Haulage is conducted from rooms to sidetrack, a distance of 2,300 feet, by mules; from sidetrack to tippie, a distance of 2,500 feet, by rope; from tippie to railroad, a distance of 4,000 feet, by monitor.

Inspections made March 4, June 10, August 26, November 7.

CAMPBELL COUNTY.

Tennessee Jellico Mine—*Owner*, Tennessee Jellico Coal Co., Anthras; *Operator*, Tennessee Jellico Coal Co., Anthras; *President and General Manager*, Dr. Robert Wedekind, Knoxville; *Superintendent*, John P. Gorman, Jellico; *Inside Foreman*, P. F. Gorman, Jr., Anthras.

This is a Class B drift mine. It is located in the Cumberland Mountain, 1,400 feet above sea level. It is $\frac{1}{2}$ mile from Anthras, and connects with the Louisville and Nashville and the Southern railroads. The Jellico seam is worked, having an average thick-

ness of 52 inches. The roof is slate, and the bottom is slate and stone. It is developed on the double entry, room and pillar system. Ventilation is produced by a furnace, with a grate area of 60 feet, and is distributed by the continuous current system. Haulage is conducted from rooms to top of incline, a distance of 4,000 feet, by mules; and from top of incline to tippie, a distance of 1,100 feet, by gravity incline.

Inspections made February 26, June 3, August 8.

CAMPBELL COUNTY.

Westbourne Mine—*Owner*, Westbourne Coal Co., Westbourne; *Operator*, Westbourne Coal Co., Westbourne; *President*, Alex. Bonamon, Atlanta, Ga.; *General Manager*, Joseph Richards, Oliver Springs; *Superintendent*, David Watkins, Westbourne; *Inside Foreman*, R. T. Boone, Westbourne.

This is a Class C drift mine, located in Rich Mountain, 1,100 feet above sea level, at Westbourne. It connects with the Louisville and Nashville Railroad. The Log Mountain seam is worked. It has an average thickness of 43 inches. The roof is slate, and the bottom is fire-clay and sandstone. It is developed on the room and pillar system. Ventilation is supplied by a fan with a diameter of 10 feet, and is distributed by the split system. Haulage is conducted from butt entries to sidetrack, a distance of 2,000 feet, by gathering motors; from sidetrack to knuckle, a distance of 2,700 feet, by tram motor; from knuckle to railroad, a distance of 800 feet, by gravity incline.

Inspections made March 8, June 26, September 4.

CAMPBELL COUNTY.

White Oak Mine—*Owner*, Campbell Coal Mining Co., Westbourne; *Operator*, Campbell Coal Mining Co., Westbourne; *President*, Alex. Bonamon, Atlanta, Ga.; *General Manager*, Joseph Richards, Oliver Springs; *Superintendent*, David Watkins, Westbourne; *Inside Foreman*, James Carmack, Westbourne.

This is a Class C drift mine. It is located $1\frac{1}{2}$ miles from Westbourne, on the Louisville and Nashville Railroad. The Log Mountain seam is worked. It has an average thickness of 44 inches. This mine is developed on the double entry plan. Ventilation is produced by a fan 7 feet in diameter, and is distributed by the split current system. The mine is equipped with electric mining machines and motor haulage.

Inspections made March 8, June 26, September 4.

CAMPBELL COUNTY.

Woodward No. 1 Mine—*Owner*, C. M. Woodward, Jellico; *Operator*, C. M. Woodward, Jellico; *President*, *General Manager*, *Superintendent* and *Inside Foreman*, C. M. Woodward, Jellico.

This is a Class C drift mine. It is located in Jellico Mountain, 1,200 feet above sea level, $\frac{1}{2}$ mile from Jellico. It connects with the Louisville and Nashville and the Southern railroads. The Blue Gem seam is worked. It has an average thickness of 24 inches. The roof is slate, and the bottom is fire-clay. It is developed on the room and pillar system. It is ventilated by a furnace, with a grate area of 35 feet, and the ventilation is distributed by the split system. Haulage is conducted from headings to tippie, by mule, the distance being 1,000 feet.

Inspection made February 21.

CAMPBELL COUNTY.

Wooldridge Mine—*Owner*, Wooldridge Jellico Coal Co., Wooldridge; *Operator*, Wooldridge Jellico Coal Co., Wooldridge; *President* and *General Manager*, P. Wooldridge, Pewee Valley, Ky.; *Superintendent*, Wm. Dinkerlaker, Wooldridge; *Inside Foreman*, Thos. H. Griffith, Wooldridge.

This is a Class C drift mine. It is located in Jellico Mountain, 1,200 feet above sea level, $1\frac{1}{2}$ miles from Newcomb. It connects with the Southern Railroad. The Jellico seam is worked. It has an average thickness of 42 inches. The roof is slate, and the bottom is fire-clay. It is developed on the single entry and single room system. Ventilation is produced by a furnace, with a grate area of 64 feet. It is distributed by the direct current system. Haulage is conducted from rooms to knuckle, a distance of

1,000 feet, by mules; and from knuckle to railroad, a distance of 1,335 feet, by incline. Inspection made February 15.

CAMPBELL COUNTY.

Wynn Mine—*Owner*, Wynn Coal Co., Gatliff; *Operator*, Wynn Coal Co., Gatliff; *President and General Manager*, A. J. Jones, Gatliff; *Superintendent*, Harry Wynn, Gatliff; *Inside Foreman*, W. H. Keyes, Gatliff.

This is a Class C drift mine. It is located in Brushy Mountain, 1,200 feet above sea level, 8 miles from Lafollette; it connects with the Louisville and Nashville Railroad. The Rich Mountain seam is worked. It has an average thickness of 34 inches. The roof is slate, and the bottom is fire-clay. It is developed on the room and pillar system. Ventilation is produced by a fan 5 feet in diameter, and is distributed by the continuous current system. Haulage is conducted from mouth of rooms to top of incline, a distance of 1,600 feet, by electric motor; from top of incline to railroad, a distance of 400 feet, by monitors.

Inspections made March 7, August 23.

CAMPBELL COUNTY.

Zechini Mine—*Owner*, Peter and Thos. Zechini, Newcomb; *Operator*, Peter Zechini, Newcomb; *President, General Manager and Superintendent*, Peter Zechini, Newcomb; *Inside Foreman*, Joe Graef, Newcomb.

This is a Class C drift mine. It is located in Middle Ridge Mountain, 2½ miles from Newcomb. Its elevation is 1,275 feet above sea level. It connects with the Southern Railroad. The Jellico seam is worked. It has an average thickness of 34 inches. The roof is slate and sandstone, and the bottom consists of hard fire-clay. It is developed on the single entry and double room system. Ventilation is produced by a fan, 6 feet in diameter, and is distributed by the split system. Haulage is conducted to outside, a distance of 500 feet, by mules; from outside to knuckle, a distance of 5,000 feet, by engine; from knuckle to tippie, a distance of 1,000 feet, by gravity.

Inspections made February 22, May 15, July 30.

CLAIBORNE COUNTY.

Bryson Mountain No. 1 Mine—*Owner*, American Association, Middlesboro, Ky.; *Operator*, Bryson Mountain Coal & Coke Co., Hartranft; *President and General Manager*, Tim Cockrill, Mahoney City, Pa.; *Superintendent*, A. L. Adams, Hartranft; *Inside Foreman*, Julius Brown, Hartranft.

This is a Class C drift mine. It is located 1,759 feet above sea level, in Bryson Mountain. It is one mile from Hartranft. It connects with the Louisville and Nashville and Southern railroads. The Mingo seam is worked. It has an average thickness of 60 inches. The roof is slate, and the bottom is slate and fire-clay. It is developed on the double entry system. It is ventilated by a fan 8 feet in diameter. The ventilation is distributed by the continuous current system. Haulage is conducted from the rooms to sidetrack, a distance of 1,000 feet, by mules; from sidetrack to tippie, a distance of 6,000 feet, by motors.

Inspections made February 6, May 1, July 23.

CLAIBORNE COUNTY.

Bryson Mountain No. 2 Mine—*Owner*, American Association, Middlesboro, Ky.; *President and General Manager*, Tim Cockrill, Mahoney City, Pa.; *Superintendent*, A. L. Adams, Hartranft; *Inside Foreman*, Julius Brown, Hartranft.

This is a Class C drift mine. It is located in Bryson Mountain, 1 mile from Hartranft. It connects with the Louisville and Nashville and Southern railroads. The elevation is 2,255 feet above sea level. The Sterling seam is worked. It has an average thickness of 66 inches. The roof is slate, and the bottom is shale. It is developed on the double entry plan. This mine is ventilated by a fan 9 feet in diameter, and the ventilation is distributed by the continuous current system. Haulage is conducted from faces to tippie, a distance of 1,400 feet, by mules; from tippie to railroad, a distance of 700 feet, by rope.

Inspections made February 6, April 30.

CLAIBORNE COUNTY.

Buffalo Mine—*Owner*, Campbell Coal Mining Co., Eagan; *Operator*, Campbell Coal Mining Co., Eagan; *President*, George Campbell, Atlanta, Ga.; *General Manager*, Joseph Richards, Oliver Springs; *Superintendent*, John H. Reynolds, Eagan; *Inside Foreman*, Riley Parrott, Eagan.

This is a Class C drift mine. It is located in Cumberland Mountain, 12 miles from Jellico. It connects with the Louisville and Nashville and Southern railroads. The elevation is 1,425 feet above sea level. The Remy seam is worked. It has an average thickness of 36 inches. The roof is slate, and the bottom is sandstone. It is developed on the single entry system. It is ventilated by two fans, each 4 feet in diameter, and by two furnaces, with a grate area of 50 feet each. The ventilation is distributed by the continuous current system. Haulage is conducted from fall to drumhouse, a distance of 5,100 feet, by motor; from drumhouse to tippie, a distance of 667 feet, by gravity.

Inspections made February 27, June 4, August 7.

CLAIBORNE COUNTY.

Fork Ridge Nos. 1 and 2 Mine—*Owner*, American Association, Middlesboro, Ky.; *Operator*, Fork Ridge Coal & Coke Co., Fork Ridge; *President and General Manager*, C. S. McManus, Knoxville; *Superintendent*, A. H. Rennebaum, Middlesboro, Ky.; *Inside Foremen*, C. H. Farmer and John Lewis, Fork Ridge.

This is a Class C drift mine. It is located in Mingo Mountain, $\frac{3}{4}$ mile from Fork Ridge. It connects with the Louisville and Nashville and Southern railroads. The elevation is 1,700 feet above sea level. The Mingo seam is worked. It has an average thickness of 54 inches. The roof is slate, and the bottom is clay. It is developed on the room and pillar system. This mine is ventilated by a fan 14 feet in diameter, and the ventilation is distributed by the split system. Haulage is conducted from rooms to general sidetrack, a distance of 800 feet, by mules; from general sidetrack to siding, a distance of 2,000 feet, by motors; from siding to tippie, a distance of 6,500 feet, by motor.

Inspections made February 8, May 2, July 25.

CLAIBORNE COUNTY.

Fork Ridge No. 3 Mine—*Owner*, American Association, Middlesboro, Ky.; *Operator*, Fork Ridge Coal & Coke Co., Fork Ridge; *President and General Manager*, C. S. McManus, Knoxville; *Superintendent*, A. H. Rennebaum, Middlesboro, Ky.; *Inside Foreman*, E. Lewis, Fork Ridge.

This is a Class C drift mine. It is located in Mingo Mountain, $1\frac{1}{2}$ miles from Fork Ridge. It connects with the Louisville and Nashville and the Southern railroads. Its elevation is 2,500 feet above sea level. The Lower Hignite seam is worked. It has an average thickness of 44 inches. The roof is slate and sandstone, and the bottom is slate. It is developed on the double entry system. It is ventilated by a fan 10 feet in diameter, and the ventilation is distributed by the split system. Haulage is conducted from rooms to tippie, a distance of 1,500 feet, by motor.

Inspection made May 1.

CLAIBORNE COUNTY.

Fork Ridge No. 4 Mine—*Owner*, American Association, Middlesboro, Ky.; *Operator*, Fork Ridge Coal & Coke Co., Fork Ridge; *President and General Manager*, C. S. McManus, Knoxville; *Superintendent*, A. H. Rennebaum, Middlesboro, Ky.; *Inside Foreman*, E. Lewis, Fork Ridge.

This is a Class C drift mine. It is located in Mingo Mountain, $1\frac{1}{2}$ miles from Fork Ridge. It connects with the Louisville and Nashville and Southern railroads. The elevation is 2,300 feet above sea level. The Sterling seam is worked. It has an average thickness of 52 inches. Both the roof and the bottom are slate. It is developed on the double entry system. Ventilation is produced by a furnace.

Inspection made May 1.

CLAIBORNE COUNTY.

King Mountain Mine—*Owner*, American Association, Middlesboro, Ky.; *Operator*, King Mountain Coal Co., Chattanooga; *President and General Manager*, G. W. Easton, Middlesboro, Ky.; *Superintendent*, N. L. Reynolds, Clairfield; *Inside Foreman*, Harry Fallon, Clairfield.

This is a Class C drift mine. It is located in Log Mountain, 113 miles from Jellico. It connects with the Southern and Louisville and Nashville railroads. The elevation is 1,256 feet above sea level. The Jellico seam is worked. It has an average thickness of 41 inches. The roof is slate and the bottom is fire clay. It is developed on the single entry system. It is ventilated by a furnace with a grate area of 40 feet; the ventilation is distributed by the continuous current system. Haulage is conducted from tippie to knuckle, a distance of 650 feet, by gravity incline; from knuckle to main portal, a distance of 2,000 feet, by tail rope; from portal to sidetrack, a distance of 950 feet, by tail rope.

Inspections made February 28, June 4, August 6.

CLAIBORNE COUNTY.

Mingo No. 5 Mine—*Owner*, American Association, Middlesboro, Ky.; *Operator*, Mingo Coal & Coke Co., Hartranft; *President and General Manager*, R. L. Ralston, Hartranft; *Superintendent*, J. T. Ralston, Hartranft; *Inside Foreman*, John Minton, Hartranft.

This is a Class C drift mine. It is located in Mingo Mountain, $\frac{1}{2}$ mile from Hartranft. It connects with the Louisville and Nashville and the Southern railroads. The elevation is 2,250 feet above sea level. The Mingo No. 5 seam is worked. It has an average thickness of 52 inches. The roof is slate, and the bottom is fire clay. It is developed on the single entry, room and pillar system. Ventilation is produced by a fan 7 feet in diameter. It is distributed by the continuous current system. Haulage is conducted from rooms to sidetrack, a distance of 900 feet, by mules; from inside sidetrack to drumhouse, a distance of 3,000 feet, by gasoline motor; from drumhouse to loading tippie, a distance of 1,650 feet, by gravity. There were formerly several other openings reported as separate mines. They are now either abandoned, or included and reported on in connection with Mine No. 5.

Inspections made February 7, July 24.

CLAIBORNE COUNTY.

Nicholson No. 2 Mine—*Owner*, American Association, Middlesboro, Ky.; *Operator*, Nicholson Coal Mining Co., Fork Ridge; *President and General Manager*, J. C. Cardwell, Louisville, Ky.; *Superintendent*, E. R. Short, Nicholson; *Inside Foreman*, A. H. Davidson, Nicholson.

This is a Class C drift mine. It is located in Mingo Mountain, $\frac{1}{4}$ mile from Nicholson. It connects with the Louisville and Nashville and Southern railroads. The Sandstone Parting or Jack Rock seam is worked. It has an average thickness of 60 inches. The roof is stone, and the bottom is fire-clay. It is developed on the double entry system. It is ventilated by a fan 7 feet in diameter. The ventilation is distributed by the continuous current system. Haulage is conducted from rooms to sidetrack, a distance of 1,000 feet, by mules; from sidetrack to entrance, a distance of 900 feet, by mules; from entrance to knuckle, a distance of 900 feet, by mules; from knuckle to railroad, a distance of 2,000 feet, by gravity.

CLAIBORNE COUNTY.

Nicholson No. 3 Mine—*Owner*, Nicholson Coal Mining Co., Fork Ridge; *Operator*, Nicholson Coal Mining Co., Fork Ridge; *President and General Manager*, J. C. Cardwell, Louisville, Ky.; *Superintendent*, E. R. Short, Middlesboro, Ky.; *Inside Foreman*, A. H. Davidson, Fork Ridge.

This is a Class C drift mine. It is located in Mingo Mountain, $\frac{1}{4}$ mile from Nicholson. It connects with the Louisville and Nashville and Southern railroads. The elevation is 2,030 feet above sea level. The Nicholson seam is worked. It has an average thickness of 60 inches. The roof is slate, and the bottom is fire-clay. It is developed on the double entry system. Ventilation is produced by a fan with a diameter of 7

feet, and is distributed by the continuous current system. Haulage is conducted from rooms to entrance, a distance of 600 feet, by mules; from entrance to knuckle, a distance of 3,500 feet, by locomotive; from knuckle to railroad, a distance of 3,400 feet, by gravity.

CLAIBORNE COUNTY.

Pruden Mine—*Owner*, American Association, Middlesboro, Ky.; *Operator*, Pruden-Coal & Coke Co., Knoxville; *President and General Manager*, Thomas Pruden, Knoxville; *Superintendent*, Geo. M. Wallen, Pruden; *Inside Foreman*, Rufe Speaks, Pruden.

This is a Class C drift mine. It is located in Bryson Mountain, 1,700 feet above sea level, 20 miles from Jellico. It connects with the Louisville and Nashville and Southern railroads. The Mingo seam is worked. It has an average thickness of 60 inches. Both the roof and bottom are slate. It is developed on the room and pillar system. Ventilation is produced by a fan 12 feet in diameter, and is distributed by the split system. Haulage is conducted from rooms to sidetrack, a distance of 800 feet, by mules; from sidetrack to tippie, a distance of 6,000 feet, by electric motors; from tippie to chute, a distance of 1,500 feet, by monitors.

Inspections made February 1, April 15, August 5.

CLAIBORNE COUNTY.

Reliance Nos. 1, 2 and 3 Mine—*Owner*, American Association, Middlesboro, Ky.; *Operator*, Reliance Coal & Coke Co., Hartranft; *President and General Manager*, Geo. W. Whiteman, Philadelphia, Pa.; *Superintendent*, J. B. Robinson, Hartranft; *Inside Foreman*, Geo. G. Bell, Hartranft.

This is a Class C drift mine. It is located in the Mullin's Spur of Bryson Mountain, at Hartranft. It connects with the Louisville and Nashville and the Southern railroads. The elevation is 1,600 feet above sea level. The Mingo seam is worked. It has an average thickness of 60 inches. Both the roof and the bottom are slate. It is developed on the double entry system. Ventilation is produced by a fan 8 feet in diameter, and by a furnace with 42 feet grate area, and is distributed by the continuous current system. Haulage is conducted from rooms to sidetrack, a distance of 500 feet, by mules; from sidetrack to tippie, a distance of 1,600 feet, by wire rope; from rooms to sidetrack, a distance of 700 feet, by mules; from sidetrack to tippie, a distance of 2,700 feet, by wire rope; from tippie to railroad, a distance of 75 feet, by chute. In the inspector's reports, Reliance Nos. 1 and 2 and Reliance No. 3, are shown and reported on as two separate mines, although they are described together in the above.

Inspections made February 7, May 1, July 24.

CLAIBORNE COUNTY.

Standard Mine—*Owner*, American Association, Middlesboro, Ky.; *Operator*, Standard Jellico Coal Co., Knoxville; *President and General Manager*, Chas. F. Eager, Knoxville; *Superintendent*, L. R. Eager, Middlesboro, Ky.; *Inside Foreman*, S. C. Craig, Clairfield.

This is a Class C drift mine. It is located in a spur of Log Mountain, $\frac{1}{2}$ mile from Clairfield, 1,240 feet above sea level. It connects with the Louisville and Nashville and Southern railroads. The Jellico seam is worked. It has an average thickness of 38 inches. The roof is slate, and the bottom is fire-clay. It is developed on the single entry system. Ventilation is produced by a fan 6 feet in diameter, and is distributed by the continuous current system. Haulage is conducted from headings to knuckle, a distance of from 1,450 to 2,000 feet, by mules; from knuckle to sidetrack, a distance of 800 feet, by gravity.

Inspections made February 28, June 5, August 7.

CLAIBORNE COUNTY.

Sterling Nos. 1 and 2 Mine—*Owner*, American Association, Middlesboro, Ky.; *Operator*, Sterling Coal & Coke Co., Manring; *President and General Manager*, C. A. McManus, Manring; *Superintendent*, C. B. Finley, Jr., Manring; *Inside Foreman*, W. T. Robinson, Manring.

This is a Class C drift mine. It is located in Log Mountain, at Manring; it connects with the Southern Railroad. The elevation is 2,300 feet above sea level. The Sterling seam is worked. It has an average thickness of 60 inches. The roof is slate, and the bottom is fire-clay. It is developed on the room and panel system. Ventilation is produced by 2 fans, and is distributed by the double entry split system. Haulage is conducted from face to small siding, a distance of 500 feet, by mules; from small sidings to main siding, a distance of 3,000 feet, by motors; from main siding to tipple, a distance of 4,000 feet, by motors.

Inspections made February 6, April 30, July 23.

CLAIBORNE COUNTY.

Yellow Creek No. 2 Mine—*Owner*, American Association, Middlesboro, Ky.; *Operator*, Yellow Creek Coal Co., Middlesboro, Ky.; *President and General Manager*, John G. Fitzpatrick, Middlesboro, Ky.; *Superintendent*, George Veal, Bosworth, Ky.; *Inside Foreman*, Dan Wallbrecht, Bosworth, Ky.

This is a Class C drift mine. It is located in Mingo Mountain, 5 miles from Middlesboro, and connects with the Louisville and Nashville and Southern railroads. The elevation is 2,275 feet above sea level. The Jack Rock seam is worked. It has an average thickness of 48 inches. The roof is slate, and the bottom is fire-clay. It is developed on the single entry system. Ventilation is produced by a fan 7 feet in diameter, and is distributed by the continuous current system. Haulage is conducted from rooms to sidetrack, a distance of 1,500 feet, by mules; from sidetrack to tipple, a distance of 1,000 feet, by motors; from tipple to railroad, a distance of 1,700 feet, by incline.

Inspections made February 9, May 3.

CLAIBORNE COUNTY.

Yellow Creek No. 3 Mine—*Owner*, American Association, Middlesboro, Ky.; *Operator*, Yellow Creek Coal Co., Middlesboro, Ky.; *President and General Manager*, John G. Fitzpatrick, Middlesboro, Ky.; *Superintendent*, George Veal, Bosworth, Ky.; *Inside Foreman*, Dan Wallbrecht, Bosworth, Ky.

This is a Class C drift mine. It is located in Mingo Mountain, 5 miles from Middlesboro. It connects with the Louisville and Nashville and Southern railroads. The elevation is 2,425 feet above sea level. The Poplar Lick seam is worked. It has an average thickness of 68 inches. The roof is slate, and the bottom is fire-clay. It is developed on the single entry system. It is ventilated by a fan 7 feet in diameter, and the ventilation is distributed by the split system. Haulage is conducted from headings to siding, a distance of 500 feet, by mules; from siding to tipple, a distance of 1,500 feet, by motors; from tipple to railroad, a distance of 400 feet, by incline.

Inspections made February 9, July 25.

CUMBERLAND COUNTY.

Clear Creek No. 1-5 Mine—*Owner and Operator*, Clear Creek Coal & Lumber Co., Isoline; *President*, J. E. Cummins, Columbus, Ohio; *Superintendent*, J. L. Barr, Isoline; *Inside Foreman*, W. H. Reeves, Isoline.

This mine is located at Isoline, on branch line of the Tennessee Central Railroad, connecting with main line at Campbell's Junction, a distance of 8 miles. It is a Class C slope mine, operated in the Isoline seam, which has an average thickness of 3 feet, and an altitude of 1,900 feet above sea level. The system of development is by both the single and double entry methods. The roof is slate and sandshale, and the bottom is fire-clay and hard rock. In most part this mine is damp, while in other parts it is very wet. The coal is very hard, and the method of mining is principally by solid shooting, black powder being the explosive used. The ventilating current is produced by a 15-foot Crawford & McCrimmon exhaust fan, with steam connection. The air current is conveyed to the working places by means of doors and wooden stoppings, and is by continuous current. The fan housing is so constructed that this fan can reverse the ventilating current if required. An average of 41 men and 5 mules are employed on the inside work. Coal is hauled from working places to sidetrack, at foot of slope, by mules; and from this sidetrack to tipple, a distance of 500 feet, by rope.

Inspections made April 17, August 13.

CUMBERLAND COUNTY.

Fall Creek Mine—*Owner*, Fall Creek Collieries, Ozone; *Operator*, E. G. Tollett, Receiver, Crossville; Leased to William Price and T. A. Day; *Superintendent*, T. A. Day; *Foreman*, George Day, Ozone.

This is a Class C drift mine, located 2,000 feet above sea level, in the Cumberland Plateau. It is 2½ miles from Ozone, and connects with the Tennessee Central Railroad. The Sewanee seam, which is at this point very irregular in thickness, is worked. The roof is slate, and the bottom is fire-clay. It is developed on the double entry, room and pillar system, and has a furnace, although natural ventilation is found sufficient at present. No development is being done, the work consisting of drawing back and recovering pillars, the main entry pillars, however, being left. The mine has only a small output. Haulage is by mules.

Inspections made March 19, June 14 and September 9.

FENTRESS COUNTY.

Davidson Mine—*Owner*, Bruno Gernt, Allardt; *Operator and Superintendent*, G. M. Fritts, Davidson.

This is a Class D drift mine, operated in the No. 2 or Bon Air seam, which has at this point an average thickness of 50 inches. It is located about 1½ miles northwest from Highland Junction, on Crawford branch line of Tennessee Central Railroad, and connects with this branch line and station by the Davidson Lumber Co.'s railroad. This is a damp mine generally, and the method of mining is by solid shooting, the explosive used being black powder. The roof is slate, and the bottom is hard fire-clay. Ventilation is produced by a small furnace, and is by continuous current. An average of 5 men are employed on the inside work. Coal is hauled from rooms to tippie by mules, and from tippie to Highland Junction by locomotive, on D. H. & G. Railroad.

Inspection made December 5. This is a new mine and is yet in the outcrop.

FENTRESS COUNTY.

Wilder No. 1-2 Mine—*Owner and Operator*, Fentress Coal & Coke Co., Wilder; *President*, G. H. Taylor, Philadelphia; *Superintendent*, from first of the year to October 20, Joseph Cain, Wilder; from October 20 to end of year, U. R. Custred, Wilder; *Inside Foreman*, first part of the year, Titus Barwick, Wilder; latter part of the year, E. W. Mansfield, Wilder.

This is a Class B drift mine, operating in the No. 2 Bon Air seam, which has at this point an average thickness of 4½ feet, and an elevation of 1,620 feet above sea level. It is located at Wilder, and connects by branch line with the Tennessee Central Railroad at Monterey, a distance of 20 miles. It is developed on the double entry and double room system. The roof is a hard slate, underlaid with a strata of a sandstone nature, varying in thickness from 10 to 15 inches, making a strong and excellent support for the top. The bottom is a hard fire-clay. Some parts of this mine are inclined to be a little dry, while other portions are damp, and some even wet. The drainage in general, except in local dips, is very good. The coal is very hard, and some of it is undercut with electric mine machines, and some of it shot off the solid. Where solid shooting is practiced, heavy charges of black powder are required to break the coal. Ventilation is produced by a 10-foot Crawford & McCrimmon exhaust, and a 7-foot Stine disk fan, with electrical connections, and is distributed by the split system. The ventilating current is conveyed to the headings and other working faces by means of doors and wooden stoppings. An average of 87 men are employed on the inside work of the mine. Coal is hauled from headings and other working places to tippie by electric motors.

Inspections made February 6, June 18, September 24, December 4.

GRUNDY COUNTY.

Coalmont A, B, L and O Mines—*Owner and Operator*, Sewanee Fuel & Iron Co., Coalmont; *President*, J. E. Patton, Chattanooga; *Superintendent*, H. S. Walden, Coalmont; *Inside Foreman*, J. M. Sehorn, Coalmont.

This mining plant consists of four openings, situated near each other, and operated by the same management. It is located at Coalmont, 7 miles north from Tracy City,

and at the terminus of the Nashville, Chattanooga and St. Louis Railway branch line, connecting with the main line at Cowan, a distance of 27 miles. It is opened up and operated in the Sewanee seam, which has an average thickness of 34 inches. The elevation above sea level is 1,904, 1,907 and 1,923 feet respectively. The roof is generally slate, but in some parts it is of a sandstone nature. These openings are developed on the single entry, room and pillar method. These mines in general are damp, while some sections are rather wet. The coal is of a soft nature, and some of it is partly cut with the pick and then blasted with black powder. Ventilation is furnished by furnaces, and is generally very poorly distributed in working faces. The ventilating current is conveyed throughout the workings by means of doors and wooden brattices. A daily average of 162 men and 21 mules are employed on the inside work of all these openings. Coal is hauled from working places to tipples by mules.

Inspections made March 7, June 12, September 19, December 11.

GRUNDY COUNTY.

East Fork Mine—*Owner and Operator*, Tennessee Consolidated Coal Co., Tracy City; *President*, E. L. Hampton, Tracy City; *Superintendent*, R. B. Roberts, Tracy City; *Inside Foreman*, W. C. Parsons, Tracy City.

This is a Class D drift mine, operated in the Sewanee seam, which has an average thickness of 42 inches. This mine is situated on branch line of Nashville, Chattanooga and St. Louis Railway, about 1 mile northeast from Tracy City. It has an elevation of 1,900 feet above sea level. This mine has no defined system of either development or ventilation, as the work being performed is confined to drawing entry stumps in the outcrop, and will require only a few months to complete the work. The roof is slate, and is generally good, and the bottom fire-clay. Only 4 or 5 men are employed in the work. All coal is hauled from working places to tipple by mules.

Inspection made September 18.

GRUNDY COUNTY.

Ferguson Mine—*Owner*, M. J. Ferguson, Huntington, W. Va.; *President*, J. B. Ferguson, Coalmont; *Operator, Superintendent and Inside Foreman*, J. A. Harrison, Coalmont.

This mine is situated about $\frac{1}{2}$ mile north of Coalmont, and connected with branch line of Nashville, Chattanooga and St. Louis Railway, at Coalmont. It is a Class D drift mine, located 1,900 feet above sea level. The Sewanee seam, having an average thickness of 24 inches, is worked. It is opened up on the single entry plan. The roof is slate, and the bottom hard rock. It is a very wet mine, and the method of disposing the water is by hauling it to the outside in water cars. The ventilating current is furnished by a furnace, and is distributed as continuous current. Solid shooting is practiced, and the explosive used is black powder. An average of 10 men and 1 mule is employed on the inside work. Coal is hauled from rooms and other working places to tipple, a distance of about 2,000 feet, by mules.

Inspections made March 7, June 12.

GRUNDY COUNTY.

Flat Branch Mine—*Owner*, Staub heirs, Knoxville; *Operator*, Flat Branch Coal Co., Meeks; *Superintendent*, W. H. Workman, Meeks; *Inside Foreman*, J. C. Roberts, Tracy City.

This is a Class D drift mine, located 1,900 feet above sea level, operating in the Sewanee seam, which has an average thickness of 32 inches. This mine is situated on a branch line of the Nashville, Chattanooga and St. Louis Railway, about 1 mile from Meeks. This mining plant is made up of five little openings in the outcrops of abandoned workings. No system of either ventilation or development is maintained. The roof is slate, and the bottom fire-clay. An average of 10 men and 1 mule is employed on the inside. Coal is hauled from working places in mines to tipple by mules.

Inspections made September 19, December 11.

GRUNDY COUNTY.

Henley Mine—*Owner and Operator*, Tennessee Consolidated Coal Co., Tracy City; *President*, E. L. Hampton, Tracy City; *Superintendent*, R. B. Roberts, Tracy City; *Inside Foreman*, W. C. Parsons, Tracy City.

This mine is located 1½ miles southeast of Tracy City on branch line, connecting with Nashville, Chattanooga and St. Louis branch line railroad, at Tracy City. It is a Class D drift mine, operating in the Sewanee seam, which has an average thickness of 42 inches, and an altitude of 1,962 feet above sea level. The roof and bottom are both slate. This mine is generally damp, and the method of mining is by solid shooting with black powder. It is operated on the single entry plan. It has a small furnace for ventilating purposes. An average of 8 men and 1 mule is employed. All coal is hauled from working places in mine to tipples by mules.

Inspection made June 11.

GRUNDY COUNTY.

Lone Rock Mine—*Owner and Operator*, Tennessee Consolidated Coal Co., Tracy City; *President*, E. L. Hampton, Tracy City; *Superintendent*, R. B. Roberts, Tracy City; *Inside Foreman*, W. C. Parsons, Tracy City.

This mine is situated about 1 mile northeast from Tracy City, on branch railroad line, connecting with the Nashville, Chattanooga and St. Louis branch line railroad at Tracy City. This is a Class D drift mine, operated in the Sewanee seam, which has an average thickness of 42 inches. The elevation of this mine is 1,960 feet above sea level. This is a very old mine, and all work being performed in it now is confined to drawing pillars and entry stumps. The ventilating current is produced by natural conditions, and is ample for men employed. The roof is slate, and the bottom fire-clay. This is a damp mine in general, but some parts are very wet; 10 men and 2 mules are employed on the inside work. All coal is hauled from working places to tipples by mules.

Inspections made September 18, December 12.

GRUNDY COUNTY.

Ramsey Mine—*Owner and Operator*, Tennessee Consolidated Coal Co., Tracy City; *President*, E. L. Hampton, Tracy City; *Superintendent*, R. B. Roberts, Tracy City; *Inside Foreman*, J. D. Wiley, Tracy City.

This mine is located 2½ miles southwest of Tracy City, on a railroad branch line, connecting with the Nashville, Chattanooga and St. Louis Railway. This is a Class C drift mine, composed of a number of little openings in the outcrops of old abandoned works. These openings are near each other, and are all under the same management. The Sewanee seam, with an average thickness of 42 inches, is worked. This seam at this point has an elevation of 1,903 feet above sea level. The roof is slate, and the bottom is generally slate or fire-clay. These little openings in most parts are damp, while other parts are wet. As robbing is the principal work being done, no defined plan of work or system of ventilation is practiced or carried out. An average of 40 men and 10 mules are employed on the inside work. Coal is hauled from all working places to tipples by mules.

Inspection made September 20.

GRUNDY COUNTY.

Reid Hill Mine—*Owner and Operator*, Tennessee Consolidated Coal Co., Tracy City; *President*, E. L. Hampton, Tracy City; *Superintendent*, R. B. Roberts, Tracy City; *Inside Foreman*, W. C. Parsons, Tracy City.

This mine is located about 1½ miles southeast of Tracy City, on branch railroad line, connecting with the Nashville, Chattanooga and St. Louis Railway at Tracy City. It is a Class C drift mine, and has an elevation above sea level of 1,910 feet. The Sewanee seam, having an average thickness of 42 inches, is operated. The roof is slate, and the bottom fire-clay. Generally, this is a damp mine in most parts, while other parts are wet. There is no well defined plan of work or method of ventilation in this mine, as the work is principally rob work, and ventilation is produced by natural means. An average of 33 men and 9 mules are employed on the inside work. Coal is hauled from working places in the mine to the tipples by mules.

Inspections made June 13, September 18, December 12.

GRUNDY COUNTY.

Werner Mine—*Owner and Operator*, Tennessee Consolidated Coal Co., Tracy City; *President*, E. L. Hampton, Tracy City; *Superintendent*, R. B. Roberts, Tracy City; *Inside Foreman*, W. C. Parsons, Tracy City.

This mine is located about 1 mile northeast of Tracy City, and connects by branch line with the Nashville, Chattanooga and St. Louis Railway at Tracy City. It is a Class C drift mine, operated in the Sewanee seam, which has an average thickness of 3 feet. This mine has an elevation of 1,965 feet above sea level. The roof is slate, and the bottom fire-clay. There is no well defined method of either development or ventilation, as this mine consists of four openings, and the work is principally extracting pillars and entry stumps of an old and abandoned mine, and the ventilation furnished by natural conditions. This is in most parts a damp mine, while some sections are inclined to be wet. An average of 28 men and 3 mules are employed on the inside. Coal is gathered from working places and hauled to tipple by mules.

Inspections made June 13, September 18, December 12.

HAMILTON COUNTY.

Alexander Mine—*Owner*, Charles E. Allen, Daisy; *Operator and Superintendent*, T. A. Alexander, Daisy.

This is a Class D drift mine, operated in the No. 10 seam, which has an average thickness of about 30 inches, and an altitude of 1,965 feet above sea level. It is located on Walden's Ridge, 3 miles west of Melville Station, on the Queen and Crescent Railroad. The roof is slate, and the bottom fire-clay. This is a damp mine, and the method of obtaining the coal is principally by solid shooting with black powder. As this mine consists of a number of little openings in the outcrops, it has no well defined method of development. Ventilation is furnished by a small furnace, and also by natural conditions, and is generally feeble in the working faces; 4 or 5 men are generally employed on the inside work. Coal is hauled from working places to tipple by mules, and from tipple to Melville in wagons. This coal is used for heating pottery kilns.

Inspection made June 6.

HAMILTON COUNTY.

Big Soddy No. 7 Mine—*Owner and Operator*, Durham Coal & Iron Co., Chattanooga; *President*, C. B. Eddy, Chattanooga; *Superintendent*, J. H. Jones, Soddy; *Inside Foreman*, J. B. Mansfield, Soddy.

This is a Class C drift mine, located high up in Walden's Ridge, $1\frac{1}{2}$ miles northward of Rathburn Station, on the Queen and Crescent Railroad. The No. 7 seam, located 1,200 feet above sea level, and having an average thickness of 3 feet, is operated. The seam at this point, near the outcrops, is very irregular in formation, but becomes more uniform as advancement is made. The roof is a hard blue slate, and the bottom is sandstone. The coal is of a soft nature, and is overlaid with a strata of rash or draw slate, varying in thickness from 3 to 6 inches. The method of mining is by solid shooting with black powder. This mine is generally moist, but some sections are inclined to be a little dry. Ventilation is produced by a 10-foot Crawford & McCrimmon exhaust fan, with steam connections, and conducted through the working faces by wooden stoppings, and distributed as a continuous current. It is developed on the double entry system. An average of 32 men and 6 mules are employed. Coal is hauled from working faces to sidetrack by mules, and from sidetrack to head of incline, a distance of about 2,500 feet, by main and tail rope; then lowered down incline in mine cars, a distance of 700 feet, by gravity drum to tipple; and from tipple, by locomotive, on spur line, to station on Queen & Crescent Railroad.

Inspections made January 16, May 13, November 19.

HAMILTON COUNTY.

Montlake Mine—*Owner and Operator*, Montlake Coal Co., Chattanooga; *President*, G. S. Mahan, Chattanooga; *Superintendent and Inside Foreman*, Thomas Dagnan, Montlake. During the first part of the year F. B. Keiser and H. S. Geismer operated this mine, with H. S. Geismer, *Superintendent*, Montlake; and Joe White, *Inside Foreman*, Montlake.

This is a Class C drift mine, operating in the No. 10 seam, located 1,650 feet above sea level, and has an average thickness of 36 inches. It is located high up in Walden's Ridge, about $1\frac{1}{2}$ miles westward from Montlake Station, on the Queen & Crescent Railroad. It is opened up and developed on the single entry, single room and pillar system. Ventilation is produced by a 7-foot Stine fan, and is by continuous current, and

conducted throughout the development by wooden stoppings. The roof is slate, and the bottom is slate and rock. This is a damp or moist mine, and solid shooting is generally practiced, black powder being the explosive used. Coal is hauled from working faces to sidetrack by mules, and from sidetrack to tippie, a distance of 3,328 feet, by main and tail rope; then lowered from tippie to chute, down an incline, in monitor cars, a distance of 2,020 feet, by drum; and then from chute, at foot of incline, by locomotive, on spur line, to Montlake Station on Queen and Crescent Railroad. An average of 80 men and 9 mules are employed in this mine.

Inspections made February 23, June 6, September 10, December 20.

HAMILTON COUNTY.

Sale Creek Mine—*Owner and Operator*, Durham Coal & Iron Co., Chattanooga; *President*, C. B. Eddy, Chattanooga; *Superintendent*, J. H. Jones, Soddy; *Inside Foreman*, R. L. Woods, Sale Creek, first part of the year; and Dan C. Parry, Sale Creek, latter part of the year.

It is located in the base of Walden's Ridge, 1 mile west of Sale Creek. It is a Class B slope mine, opened up on the double entry system, and operated in the Nelson or No. 2 seam, having an average thickness of 42 inches, and located 875 feet above sea level. Ventilation is produced by a 10-foot Crawford & McCrimmon exhaust fan, with steam connections, and is conducted throughout the development by means of wooden stoppings, and is very well distributed in headings. The roof is slate, and the bottom is hard rock. The greater part of the mine is damp, and some sections are wet. The coal is rather soft and has a strata of slaty rash through it, varying in thickness from 1 to 4 inches. The method of mining is by solid shooting with black powder. An average of 126 men and 22 mules are employed, producing a daily output of 475 tons. Haulage is conducted from working faces to sidetrack by mules, and from sidetrack to tippie, a distance of 3,600 feet, by rope; and from tippie by locomotive on spur line to station on the Queen & Crescent Railroad.

Inspections made January 17, April 3, July 5, October 3.

HAMILTON COUNTY.

Soddy No. 1-2 Mine—*Owner and Operator*, Durham Coal & Iron Co., Chattanooga; *President*, C. B. Eddy, Chattanooga; *Superintendent*, J. H. Jones, Soddy; *Inside Foreman*, John Olinger, Soddy; *Assistant Inside Foreman*, Robert Armour, Soddy.

This mine is located in Walden's Ridge, $1\frac{1}{2}$ miles westward of Rathburn Station, on the Queen and Crescent Railroad. It is a Class C drift mine, operated in the No. 7 seam, which has an average thickness of 28 inches and an altitude of 1,268 feet above sea level. This is generally a damp or moist mine, and some sections are inclined to be rather wet. In some sections the roof is sandstone and in others it is slate and sand shale. The coal is hard, and the method of mining is by solid shooting with black powder. It is developed on the double entry and double room system. The development of this mine is very extensive, and ventilation is produced by three 4-foot high-speed Robison force fans, with electrical connections, and is distributed on the continuous current system; and conducted to the working faces by stone and wooden stoppings. An average of 225 men and 25 mules are employed. Haulage is conducted from working faces to district sidetracks by mules, and from siding in No. 1 district to main sidetrack, a distance of 4,600 feet, by main and tail rope; and from siding, in No. 2 district, to main sidetrack, a distance of 2,400 feet, by gasoline motor; and from main sidetrack to head of incline on the outside, a distance of 4,700 feet, by electric motors. It is then lowered down an incline in the mine cars to the chute and washer, a distance of 7,100 feet, by rope and drum, which are propelled by steam.

Inspections made January 15, May 1, August 21, November 18.

HAMILTON COUNTY.

Soddy No. 4 Mine—*Owner and Operator*, Durham Coal & Iron Co., Chattanooga; *President*, C. B. Eddy, Chattanooga; *Superintendent*, J. H. Jones, Soddy; *Inside Foreman*, Robert Joseph, Soddy.

This is a Class C slope mine, developed in the No. 7 seam, having an average thickness of 30 inches. It is located in Walden's Ridge, about 2 miles westward from Rathburn Station, on the Queen and Crescent Railroad. It is opened up on the double entry

and single room system. The roof is slate, and the bottom hard fire-clay and slaty rash. The formation of the seam is very irregular, local faults appearing quickly, and then disappearing in the same way. The coal is of a soft nature, and the method of mining by solid shooting with black powder. In general, this is a damp mine, while portions of it are wet. The haulways are wet and muddy. Ventilation is produced by a small furnace, and distributed as a continuous current. The ventilating current is conducted to the working faces by wooden brattices. An average of 26 men and 4 mules are employed on the inside. Coal is hauled from working places to sidetrack by mules; and then from sidetrack to top of slope at engine room, a distance of 700 feet, by steam rope hoist; then lowered down an incline in mine cars, a distance of 1,000 feet, by rope and engine; then to head of second incline, a distance of $1\frac{1}{2}$ miles, by dinky locomotive; and then lowered down this incline in mine cars, a distance of 800 feet, by gravity drum, connecting with incline from Mine 1 and 2; and then down this incline, a distance of 3,500 feet, to chute at washer.

Inspections made May 13, November 19.

MARION COUNTY.

Battle Creek Mine—*Owner and Operator*, Battle Creek Coal & Coke Co., Orme; *President*, Roby Robinson, Atlanta, Ga.; *General Manager*, F. P. Thompson, Orme; *Superintendent*, Wm. McIntyre, Sr., Orme; *Inside Foreman*, Wm. McIntyre, Jr., Orme.

This is a Class C drift mine, operating in the Battle Creek seam, which is in thickness from a few inches to 20 feet, with a general average of about 4 feet. It is located high up in Cumberland Mountain, 1 mile northeast from Orme, and has an elevation of 1,650 feet above sea level. This seam of coal is very irregular in formation, and in some sections has one or more dirty dividing bands, ranging in thickness from 1 to 4 inches. The top is sandstone and in most sections has a regular formation, but in other portions of the mine it is irregular, and underlaid with a very troublesome draw slate. The bottom is also sandstone, and is very irregular in formation, rolling up almost suddenly and cutting the coal out, and then rolling down again as quickly. Generally, it is a moist or damp mine, but occasionally has a few places inclined to be a little dry. The method of mining is principally by solid shooting with black powder, but, however, in some parts of the mine, the coal is undercut with compressed air machines of the puncher type. This mine consists of four openings, all the coal being delivered to the same tippie. It is developed on the double entry and single room and pillar system. Ventilation is produced by a 7-foot Stine fan, with steam connection, and distributed by the split system. The ventilating current is conveyed to the headings and other working places by means of doors and wooden stoppings. An average of 103 men and 12 mules are employed on the inside work. Coal is hauled in 1, 2 and 3 openings, from working places to head of incline, by mules, the greatest distance not exceeding 2,800 feet. Haulage in No. 4 opening is conducted from rooms to sidetracks by mules, and from sidetracks to mine portal, a distance of 4,000 feet, by main and tail rope; and from mine portal to head of incline, a distance of 3,700 feet, by gasoline motor; and from head of incline to chute at foot in mine cars, a distance of 2,700 feet, by gravity drum; and then by locomotive on branch line to Bridgeport, a distance of 10 miles.

Inspections made January 25, April 8, July 25, November 14.

MARION COUNTY.

Pryor Ridge No. 1 Mine—*Owner and Operator*, Tennessee Consolidated Coal Co., Tracy City; *President*, E. L. Hampton, Tracy City; *Superintendent*, R. B. Roberts, Tracy City; *Inside Foreman*, S. L. Lowry, Tracy City; *Assistant Inside Foreman*, John Harris, Tracy City.

This is a Class C drift mine, developed in the Sewanee seam, having at this point an average thickness of 44 inches, and an elevation of 1,841 feet above sea level. It is located about 6 miles northeast from Tracy City, at terminus of branch line of the Nashville, Chattanooga and St. Louis Railway. It is developed on the single entry, room and pillar system. The roof is slate in some sections, and in others it is sandstone. The bottom is slate and hard fire-clay. The coal is of a soft nature, and the method of mining is principally by solid shooting with black powder. This is a damp or moist mine generally, but some parts are inclined to be a little dry, and others a little wet. The main haulways are generally kept clean and in good condition. Venti-

lation is furnished by an 8-foot Stine exhaust fan, with steam connection. The ventilating current is conveyed to the headings and other working places by means of doors and wooden brattices, and is distributed mostly by continuous current. An average of 166 men and 10 mules are employed on the inside work. Haulage is conducted from working faces to sidetrack by mules, and from sidetrack to tippie, a distance of 3,800 feet, with gasoline motors; and from tippie to Tracy City with locomotives.

Inspections made March 6, June 11, September 17, December 10.

MARION COUNTY.

Pryor Ridge No. 2 Mine—*Owner and Operator*, Tennessee Consolidated Coal Co., Tracy City; *President*, E. L. Hampton, Tracy City; *Superintendent*, R. B. Roberts, Tracy City; *Inside Foreman*, S. L. Lowry, Tracy City; *Assistant Inside Foreman*, John Harris, Tracy City.

This mine is situated on a branch line of the Nashville, Chattanooga and St. Louis Railway, $5\frac{1}{2}$ miles northeast from Tracy City. It is a Class C drift mine, operating in the Sewanee seam, which has an average thickness of 42 inches, and an altitude of 1,850 feet above sea level. It is a damp mine and the roadways are generally wet and muddy. The roof is slate and sandstone, and in some sections the slate is not very good. The bottom is fire-clay and in some portions is very soft. It is opened up on the single entry, room and pillar system. The method of mining is principally by solid shooting, the explosive used being black powder. The coal is of a soft nature. Very little developing is being carried on; robbing is principally the work being done. Ventilation is furnished by a small furnace, and is generally very deficient. It is distributed by the use of doors and wooden brattices. An average of 39 men and 3 mules are employed on the inside work. Coal is hauled from the working places to the tippie by mules, and from tippie to Tracy City by locomotives.

Inspections made March 6, June 11, September 17, December 10.

MARION COUNTY.

Pryor Ridge No. 4 Mine—*Owner and Operator*, Tennessee Consolidated Coal Co., Tracy City; *President*, E. L. Hampton, Tracy City; *Superintendent*, R. B. Roberts, Tracy City; *Inside Foreman*, S. L. Lowry, Tracy City; *Assistant Inside Foreman*, John Harris, Tracy City.

This is a Class C drift mine, opened up in the Sewanee seam, which has at this point an average thickness of 3 feet. It is located about $5\frac{1}{2}$ miles northeast from Tracy City, connecting with branch line of the Nashville, Chattanooga and St. Louis Railway, extended from Tracy City. The roof is slate, and the bottom hard fire-clay. This is a damp mine, and the method of obtaining the coal is principally by solid shooting, the explosive used being black powder. It is opened up on the single entry, single room and pillar system. Ventilation is produced by a small furnace, and conveyed to working faces by wooden stoppings; 11 men and 1 mule are employed on the inside work. Coal is hauled from working places to tippie, a distance of 300 feet, by mules.

Inspection made December 10. This is a new mine.

MARION COUNTY.

New Etna Mine—*Owner and Operator*, New Etna Coal Co., Chattanooga; *President*, Simon Golibart, Chattanooga; *Superintendent*, G. M. Price, first part of the year, Chattanooga; C. A. Hall, latter part of the year, Whiteside; *Inside Foreman*, J. C. Foster, Whiteside.

This is a Class C drift mine, and includes all the little mine openings of the New Etna Coal Co., located on top of the mountain. Some of these little mines have not been operating more than half time during the year. It is located about $5\frac{1}{2}$ miles northwest from Whiteside Station, on the Nashville, Chattanooga & St. Louis Railway. It is opened up in the Kelly seam, which has an average thickness of 31 inches, and an altitude of 1,480 feet above sea level. These mines are generally damp, and some of them are inclined to be wet in places. The method of obtaining the coal is mostly with picks, the coal being rather soft. Very little explosives are used. This coal is noted for its superior qualities for smithing purposes. In some of these openings only natural ventilation is used, which is ample, as the work is only robbing and only a few men employed. The openings that are advancing entries have small furnaces to give

ventilation, and the current is conveyed to headings by doors and wooden brattices, and is generally poorly distributed. The roof is slate and the bottom hard rock. Where developments are being made, it is on the single entry, single room and pillar method. An average of 53 men and 7 mules are employed on the inside work. Coal is hauled from rooms to sidetrack on outside by mules, and from sidetracks to head of incline, a distance of 23,760 feet, by dinky locomotive; and from head of incline to foot, a distance of 4,200 feet, by gravity drum; and then from foot of incline to chute, a distance of 3,800 feet, by dinky locomotive, connecting with the Nashville, Chattanooga and St. Louis Railway at Etna.

Inspections made February 20, July 1, October 22.

MARION COUNTY.

St. Anthony Mine—*Owner and Operator*, New Etna Coal Co., Chattanooga; *President*, Simon Golibart, Chattanooga; *Superintendent*, G. M. Price, first part of the year, Chattanooga; C. A. Hall, latter part of the year, Whiteside; *Inside Foreman*, Ulysses Wilson, first part of the year, Whiteside; A. C. Ervin, latter part of the year, Whiteside.

This is a Class A drift mine, operating in the Nelson seam, which has an average thickness of about 30 inches. It is located in the base of Cumberland Mountain, 1½ miles northward from Whiteside Station on the Nashville, Chattanooga and St. Louis Railway. So far as developed, the coal seam at this point is very irregular in formation, and is underlaid with a chaffy coal or rash, varying in thickness from 3 to 10 inches. The roof is slate and is generally very good. The bottom is of a hard slate nature. Generally, this is a damp mine, but some parts of it are inclined to be rather dry. This mine liberates small quantities of explosive gas, but is quickly diluted and carried away by strong air currents. The method of mining is by solid shooting, the explosive used being black powder. It is developed on the double entry and single room and pillar system. Ventilation is produced by a small furnace, and is on the continuous current method. The ventilating current is conducted through the development by wooden stoppings. An average of 17 men and 1 mule are worked on the inside. Coal is hauled from the working places to the tippie by mules, and from tippie to chute at Etna Station, a distance of ¾ miles, by dinky locomotive.

Inspections made July 1, October 22. This is a new mine.

MARION COUNTY.

Whitwell No. 1 Mine—*Owner and Operator*, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.; *President*, George W. Crawford, Birmingham, Ala.; *Superintendent*, Thomas G. Feas, first part of the year, Whitwell; W. A. Meagher, latter part of the year, Whitwell; *Inside Foreman*, T. J. Quarles, Whitwell.

This is a Class C drift mine, operating in the Sewanee seam, which has an average thickness of 40 inches, and an elevation of 1,764 feet above sea level. It is situated high up in Cumberland Mountain, on the west side of Sequatchie Valley, 1 mile northwest from Whitwell, and is connected with the Nashville, Chattanooga and St. Louis Railway, at Whitwell. Generally, this is a damp or moist mine, while some sections of it are wet. The roof is slate, and is generally of a good or safe nature. The bottom is a fire-clay and hard slate formation. The coal seam is clean and uniform in formation, varying but a few inches in thickness in any part of the mine. The method of mining is by half mining with pick, and then blasting with black powder. The haulways of this mine are kept clean and in excellent condition. Ventilation is furnished by a 6-foot Clifford exhaust fan, with electrical connections, and is distributed by the split system. The ventilating current enters the mine through 8 openings or inlets, and is conducted to the working faces by means of overcasts and wooden stoppings, and is generally well distributed. An average of 154 employees and 4 mules are worked on the inside. Haulage is conducted in some sections from working places to sidetrack by mules, and from sidetrack to tippie, a distance of 8,420 feet, by electric motors; and then lowered in monitor cars down an incline, a distance of 5,309 feet, to chute, by gravity drum.

Inspections made January 24, April 25, July 24, November 13.

MARION COUNTY.

Whitwell No. 5 Mine—*Owner and Operator*, Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.; *President*, George W. Crawford, Birmingham, Ala.; *Superintendent*,

Thomas G. Fear, first part of the year, Whitwell; W. A. Meagher, latter part of the year, Whitwell; *Inside Foreman*, John W. Smith, Whitwell.

This mine is located high up in Cumberland Mountain, on the west side of Sequatchie Valley, 2 miles northwest of Whitwell, and connects with the Nashville, Chattanooga and St. Louis Railway. It is a Class C drift mine, opened up in the Sewanee seam, which has at this point an average thickness of 39 inches, and an altitude of 1,741 feet above sea level. The roof is slate, and is generally good. The bottom is a fire-clay and hard slate formation. It is developed on the double entry, single room and pillar system. The method of obtaining the coal is by half mining with pick and then breaking down with black powder. Generally speaking, this is a damp or moist mine, with some sections very wet. The haulways in some places are a little wet, but they are kept clean and in a sanitary condition. The coal seam is generally very clean, and is of uniform formation, varying only a few inches in thickness in the different sections of the mine. The development of this mine is very extensive, and is kept clean and safe throughout. Ventilation is furnished by a 6-foot Clifford exhaust fan, with electrical connections. The ventilating current enters the mine through 5 openings or inlets, and is conveyed to the headings and other working places by means of stone and concrete overcasts and stoppings. Ventilation is by the split system, and is generally well distributed in the working faces. An average of 199 men and 12 mules are employed on the inside work. Haulage is conducted from working places to sidetrack by mules; from inside sidetrack to siding on outside, a distance of 3,960 feet, by electric motors; and from outside siding to tippie, a distance of 6,600 feet, by electric motors; and then down an incline in monitor cars to chute, a distance of 5,309 feet, by gravity drum; and then by locomotive on spur line to Whitwell Station.

Inspections made January 24, April 25, July 24, November 13.

MORGAN COUNTY.

Baker No. 1-2 Mine—*Owner*, Baker Mining Co., Coalfield; *Operator*, Baker Mining Co., Coalfield; *President and General Manager*, J. N. Baker, Rockwood; *Superintendent*, W. G. Baker, Coalfield; *Inside Foreman*, R. N. Barnes, Coalfield.

This is a Class A drift mine. It is located in Brushy Mountain, 2 miles from Coalfield, on a branch of the H. & N. E. Railroad, running from Harriman to Petros. The elevation is 1,000 feet above sea level. The Coal Creek seam is worked. It has an average thickness of 48 inches. The roof is slate and the bottom is slate and fire-clay. It is developed on the single entry system. No. 1 is ventilated by a fan 4 feet in diameter, driven by electricity. Ventilation is distributed by the continuous current system. Haulage is conducted from rooms to tippie, a distance of 1,200 to 1,800 feet, by motor. No. 2 is ventilated by a fan 7 feet in diameter, driven by steam. Ventilation is distributed by the continuous current system. Haulage is conducted from rooms to tippie, a distance of 1,200 to 1,600 feet, by motor. Nos. 1 and 2 are worked as one mine. Natural conditions, wet.

Inspections made January 29, March 27, July 15, October 3, December 9.

MORGAN COUNTY.

Big Brushy Mine—*Owner and Operator*, Big Brushy Coal & Coke Co., Petros; *Receiver*, G. W. Chandler, during the first part of the year, Harriman; *President*, Geo. P. Howard, during latter part of the year, Atlanta, Ga.; *Superintendent*, A. H. Woods, the first part of the year, Petros; V. R. Evans, the latter part, Petros; *Inside Foreman*, W. S. Scarbrough, Petros.

This is a Class B drift mine, located at Petros, on the Harriman & Northeastern Railroad, 19½ miles from Harriman. It is developed in the Jellico seam, which has an average thickness of 39 inches, and an altitude of 1,620 feet above sea level. The roof is slate and sandstone, and in some parts has a draw slate, varying in thickness from 3 to 10 inches. The bottom is hard fire-clay. Generally, this is a damp mine, and no dust of a dangerous character is found in any part of it. Under good top the coal is undercut with electric machines of the chain type, and by compressed air machines of the puncher type, and under bad top with picks. Black powder is used for blasting purposes in the coal, and dynamite in the top. Ventilation is produced by a 5-foot disk fan, with electrical connections, and is distributed as continuous current. An average of 61 men are employed on the inside. Haulage is conducted from rooms to

tipple, a distance of 4,000 feet, by electric motors; and from tipple to chute at foot of incline, a distance of 1,180 feet, by gravity drum.

Inspections made February 27, May 7, August 5, October 29.

MORGAN COUNTY.

Big Mountain Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Big Mountain Coal Co., Oliver Springs; *President*, J. R. Barnes, Chattanooga; *General Manager and Superintendent*, E. D. Phillips, Oliver Springs; *Inside Foreman*, Alex. Allen, Oliver Springs.

This is a Class A drift mine. It is located in Big Mountain, 4 miles from Oliver Springs. It connects with the Southern Railroad; is 1,100 feet above sea level. The Coal Creek seam is worked. It has an average thickness of 40 inches. The roof is slate, and the bottom is fire-clay. It is developed on the double and single entry system. Ventilation is produced by a furnace with a grate area of 48 feet, and the ventilation is distributed by the continuous current system. Haulage is conducted from faces to tipple, a distance of from 1,800 to 4,000 feet, by mules.

Inspections made January 30, June 13.

MORGAN COUNTY.

Bowling No. 2 Mine—*Owner*, Bryn Mawr Mining & Land Co., Knoxville; *Operator*, Coalfield Coal Co., Coalfield; *President*, P. J. Brisco, Knoxville; *General Manager and Superintendent*, W. E. Brickerhoff, Coalfield; *Inside Foreman*, M. F. Hatfield, Coalfield.

This is a Class A drift mine. It is located in Big Brushy Mountain, 1 mile from Coalfield, on a spur track of the H. & N. E. Railroad, 1,000 feet above sea level. The Coal Creek seam is worked. It has an average thickness of 48 inches. The roof is slate, and the bottom is fire-clay and slate. It is developed on the double entry room and pillar system. Ventilation is produced by a fan 7 feet in diameter, and is distributed by the continuous current system. Haulage is conducted from rooms to tipple, a distance of from 1,500 to 5,000 feet by electricity.

Inspections made January 29, March 27, July 15, October 3, December 10.

MORGAN COUNTY.

Harriman Mine—*Owner and Operator*, Harriman Coal Co., Harriman; *President*, S. E. DeFrese, Chattanooga; *Superintendent and Inside Foreman*, G. W. Walker, Harriman, first part of the year; George Cain, Harriman, latter part of the year.

This is a Class D drift mine, located about 7 miles from Harriman, on the Harriman and Northeastern Railroad. The Hooper seam, having an average thickness of 25 inches and an elevation of 1,100 feet above sea level, is worked. The roof is sandstone and sandstone shale, and the bottom hard fire-clay. It is developed on the single entry, single room and pillar system. Ventilation is furnished by a small furnace, and is by continuous current. The ventilating current is conveyed to the working faces by means of doors and wooden brattices. The coal is hard, and the method of mining is by solid shooting with black powder. Coal is hauled from working places to head of incline, a distance of 1,500 feet, by mules; from top of incline to foot, a distance of 760 feet, by gravity drum; from foot of incline to tipple, a distance of 1 mile, by mules; from tipple to Blizzard switch, on H. & N. E. R. R., a distance of $\frac{1}{2}$ mile, by locomotives.

Inspections made May 10, November 27.

MORGAN COUNTY.

Hooper Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Norris Bottomlee, Blue Gem.

This mine is located on the Harriman and Northeastern Railroad, about 8 miles from Harriman. It is a Class D drift mine, operating in the Hooper seam, which has an average thickness of 27 inches. This is a damp mine, and the method of mining is principally by solid shooting with black powder. The roof is sandstone, and the bottom hard fire-clay. It is developed on the single entry system. Ventilation is furnished by a small furnace, and distributed as a continuous current. This is a very small mine,

employing only 3 or 4 men on the inside. Coal is hauled from headings and rooms to tipple by mules, and from tipple at mine, to tipple at railroad, a distance of 1,000 feet, by gravity car.

Inspection made May 10.

MORGAN COUNTY.

Jackson Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Jackson Bros. Coal Co., Oliver Springs; *President and General Manager*, Thomas Jackson, Oliver Springs; *Superintendent and Inside Foreman*, Alex. Jackson, Oliver Springs.

This is a Class C drift mine. It is located in a spur of Cumberland Mountain, 2 miles from Oliver Springs. The elevation is 1,100 feet above sea level. It connects with the Southern Railroad. The Poplar Creek seam is worked. It has an average thickness of 36 inches. The roof is slate, the bottom is fire-clay. It is developed on the single entry system. Ventilation is produced by a furnace with a grate area of 6 feet, and is distributed by the continuous current system. Haulage is conducted from faces to tipple, a distance of from 1,000 to 2,000 feet, by mules.

Inspection made August 23.

MORGAN COUNTY.

Jackson Mine (R. H. Jackson)—*Owner*, John M. Davis, Wartburg; *Operator*, R. H. Jackson, Coalfield.

This is a Class D drift mine, located about 1 mile west from Coalfield. The seam operated has an average thickness of 42 inches. It is developed on the single entry method. This is a damp mine, operated in the outcrops. The roof is a hard blue slate, and the bottom is hard fire-clay. This seam has two bands of slate, varying in thickness from 6 to 10 inches. The coal is mined with picks, no powder being used. Only 3 or 4 men are employed on the inside work. Ventilation is by natural means, and is fairly good. Coal is hauled from rooms to outside by mules, and from mine to Coalfield by wagons.

Inspection made May 10.

MORGAN COUNTY.

Little Brushy Mine—*Owner*, Bryn Mawr Mining & Land Co., Knoxville; *Operator*, Little Brushy Coal Co., Atlanta, Ga.; *President*, R. O. Howard, Atlanta, Ga., *Superintendent and Inside Foreman*, J. C. Horton, Stephens.

This mine is located on the Harriman and Northeastern Railroad, 13 miles from Harriman, and about $\frac{1}{2}$ mile west from Stephens, a station on this road. It is a Class C drift mine, opened up in the Jellico seam, which has an average thickness of 33 inches, and an elevation of 1,675 feet above sea level. This mine is composed of a number of little openings in the same seam, and has no well defined method of ventilation, the current being furnished by natural means. The roof is generally sandstone, but in some sections it is hard slate. This is a damp mine and no dust is found in any part of it. It is developed on the single entry system. The coal is mostly cut with compressed air machines of the puncher type, and broken down with black powder. An average of 42 men and 4 mules are employed on the inside work. Haulage is conducted from working places to head of incline, a distance from most extreme part of mines of 1,800 feet, by mules; and from head of incline to tipple at foot, a distance of 1,616 feet, in mine cars, by gravity drum; and then loaded into railroad cars on spur line connecting with H. & N. E. line at Stephens.

Inspections made May 9, August 7, October 31.

MORGAN COUNTY.

Mount Carbon Mine—*Owner*, Mrs. W. C. Walker, Oliver Springs; *Operator*, Wiley Coal Co., Oliver Springs; *President and General Manager*, E. F. Wiley, Oliver Springs; *Superintendent and Inside Foreman*, A. R. Walls, Oliver Springs.

This is a Class C drift mine. It is located in a spur of Cumberland Mountain, and is 1,200 feet above sea level, 2 miles from Oliver Springs. The Mount Carbon seam is worked. It has an average thickness of 38 inches. It is developed on the single entry system. Ventilation is produced by a furnace with a grate area of 18 feet. Haulage is conducted from faces to top of incline, a distance of from 300 to 1,400 feet, by

mules; by gravity 300 feet; and from bottom of incline to tippie, a distance of 2,500 feet, by mules.

Inspections made January 30, September 9.

MORGAN COUNTY.

Oliver Mine—*Owner*, Richards Bros., Oliver Springs; *Operator*, Oliver Coal Co., Oliver Springs; *President, General Manager and Superintendent*, W. D. Richards, Oliver Springs; *Inside Foreman*, Isaac Carson, Oliver Springs.

This is a Class C drift mine. It is located in a spur of Cumberland Mountain, 3½ miles from Oliver Springs. It connects with the Southern Railroad. The elevation is 1,000 feet above sea level. The Coal Creek seam is worked. It has an average thickness of 48 inches. The roof is slate, and the bottom is fire-clay. It is developed on the single entry system. It is ventilated by a furnace with a grate area of 30 feet. Ventilation is distributed by the continuous current system. Haulage is conducted from faces to tippie, a distance of from 1,000 to 1,500 feet, by mules.

Inspection made March 23.

MORGAN COUNTY.

Poplar Creek Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Poplar Creek Coal Co., Oliver Springs; *President and General Manager*, Thomas Pruden, Knoxville; *Superintendent*, James Williams, Oliver Springs; *Inside Foreman*, Sam Price, Oliver Springs.

This is a Class A drift mine. It is located in Cumberland Mountain, 4 miles from Oliver Springs. The elevation is 1,150 feet above sea level. The Coal Creek seam is worked. It has an average thickness of 44 inches. The roof is slate, and the bottom is fire-clay. It is developed on the double and single entry system. It is ventilated by a furnace, with a grate area of 40 feet. Ventilation is distributed by the continuous current system. Haulage is conducted from faces to tippie, a distance of from 1,000 to 1,800 feet, by mules.

Inspection made October 9.

MORGAN COUNTY.

Prudential Mine—*Owner*, Coal Creek Mining & Mfg. Co., Knoxville; *Operator*, Prudential Coal Co., Oliver Springs; *President*, John L. Boyd, Knoxville; *General Manager and Superintendent*, L. O. Stone, Oliver Springs; *Inside Foreman*, R. S. Davis, Oliver Springs.

This is a Class A drift mine. It is located in Cumberland Mountain, 4 miles from Oliver Springs, 1,200 feet above sea level. It is connected with the Southern Railroad. The Coal Creek seam is worked. It has an average thickness of 48 inches. The roof is slate, and the bottom is fire-clay. It is developed on the double entry system. Ventilation is produced by a furnace with a grate area of 48 feet, and is distributed by the continuous current system. Haulage is conducted from faces to drum house, a distance of from 2,800 to 4,000 feet, by mules; and from drum house to tippie, a distance of 1,300 feet, by gravity.

Inspections made January 25, March 25, June 13, August 23, October 16.

MORGAN COUNTY.

Reed Mine—*Owner*, E. A. Reed, Trustee, Oliver Springs; *Operator*, Oliver Springs Coal & Clay Co., Oliver Springs; *President and General Manager*, W. C. Morrison, Oliver Springs; *Inside Foreman*, George Cagley, Oliver Springs.

This is a Class C drift mine. It is located in a spur of Cumberland Mountain, 1 mile from Oliver Springs. It connects with the Southern Railroad. The elevation is 950 feet above sea level. The seam under the Coal Creek seam is worked. The top is slate, and the bottom is fire-clay. The coal has an average thickness of 22 inches, and the fire-clay has an average thickness of 42 inches. Same is being mined and manufactured into brick. This company has 8 brick furnaces in operation. Ventilation is produced by a furnace with a grate area of 24 feet, and is distributed by the continuous current system. Haulage is conducted from faces to tippie, a distance of about 1,300 feet, by mules.

Inspection made July 11.

MORGAN COUNTY.

State Mine—*Owner and Operator*, State of Tennessee, Nashville; *General Manager*, E. W. Essary, Petros; *Superintendent*, A. W. Evans, Petros; *General Inside Foreman*, S. H. Jestes, Petros; *Assistant Inside Foremen*, W. R. Bedford, W. R. Phillips, James Rodgers and E. F. Brown, Petros.

This is a Class B drift mine, operating in the Jellico seam, which has an average thickness of 30 inches, and an altitude of 1,620 feet above sea level. It is located 1 mile northeast from Petros, at terminus of Harriman & Northeastern Railroad. It is developed on the double entry and panel system. The roof is hard blue slate, and generally very good. The bottom is hard fire-clay. This seam is generally free from impurities, and in most sections can be mined with picks. In some sections this mine is inclined to be dry, but in most parts it is moist or damp. Ventilation is furnished by a 14-foot Jeffrey exhaust fan, with electric connection. The ventilating current is distributed by the split system, and is conveyed throughout the development by doors and wooden stoppings. This mine is operated with State convicts, employing an average inside force of 365 men and 29 mules. Coal is undercut with electric mining machines and picks. Black powder is used for blasting purposes. Coal is hauled from rooms and other working places to sidetracks by mules, and from sidetracks to tipple, a distance of 8,000 feet, by electric motors; and from tipple to railroad chute, a distance of 731 feet, by gravity incline.

Inspections made February 28, May 8, August 6, November 26.

OVERTON COUNTY.

Brier Hill No. 1 Mine—*Owner and Operator*, The Brier Hill Collieries, Crawford; *President*, W. L. Wagoner, New York; *Superintendent*, Reece Watkins, Crawford; *Inside Foreman*, A. H. Davidson, Crawford, first part of the year; Robt. F. Pope, Crawford, latter part of the year.

This mine is located at Crawford, on branch line of Tennessee Central Railroad, about 15 miles from Monterey. This is a Class C drift mine, with an elevation of 1,690 feet above sea level. The Bon Air seam, which has an average thickness of 36 inches, is worked. The development is on the double entry, room and pillar method. The roof is slate, shale and sandstone, and the bottom hard fire-clay. In most parts this mine is damp. The method of mining is principally by solid shooting, black powder being the explosive used. Ventilation is furnished by a 10-foot exhaust fan, with electric connections, and distributed as continuous current. An average of 39 men and four mules are employed on the inside work. Coal is hauled from working places in mine to sidetracks by mules, and from sidetracks to tipple, a distance of 4,300 feet, by electric motors.

Inspections made February 7, June 19, September 25, December 5.

OVERTON COUNTY.

Brier Hill No. 2 Mine—*Owner and Operator*, The Brier Hill Collieries, Crawford; *President*, W. L. Wagoner, New York; *Superintendent*, Reece Watkins, Crawford; *Inside Foreman*, A. H. Davidson, Crawford, first part of the year; Robert F. Pope, Crawford, latter part of the year.

This is a Class C drift mine, with an altitude of 1,690 feet above sea level. It is located at Crawford, a station on the Wilder branch line of the Tennessee Central Railroad, distant about 15 miles from Monterey. The Bon Air seam, having an average thickness of 34 inches, is worked. The method of development is on the double entry, single room and pillar system. The roof is slate and sandstone, and the bottom hard rock. In most parts this is a damp or moist mine. Solid shooting is generally practiced in obtaining the coal, and the explosive used is black powder. Ventilation is produced by a 10-foot exhaust fan, with electric connections. The ventilating current is conveyed to the working faces by doors and other wooden stoppings, and distributed as continuous current. The work being performed in this mine is confined principally to robbing. An average of 22 men are employed on the inside. Coal is hauled from rooms and other working places to tipple, a distance in most extreme part of 1 mile, with electric motors.

Inspections made February 7, June 19, September 25, December 5.

OVERTON COUNTY.

Obey City Mine—*Owner*, Obey River Coal Co., Nashville; *Operator*, East Fork Coal & Coke Co., Monterey; *Superintendent*, S. A. Boorer, Monterey; *Inside Foreman*, D. T. Jenkins, Obey City, first part of the year; A. H. Davidson, Monterey, latter part of the year.

This mine is located $\frac{1}{2}$ mile from Obey City, a station on the Wilder branch railroad, 7 miles from Monterey, and connects with the Wilder branch line at Obey City, by spur line. It is a Class D drift mine, with an elevation above sea level of 1,600 feet. It is operated in the Bon Air No. 2 seam, which has at this point an average thickness of 34 inches. The roof is a slippery slate and shale, and the bottom shale and hard rock. It is developed on both the single and double entry plan. Ventilation is produced by furnace, and the current is conveyed to the working faces by doors and brattices and distributed as continuous current. This is a very damp mine. The coal is rather dirty in some places. Solid shooting is generally practiced, the explosive being black powder. Coal is hauled from working places in the mine to the tippie, a distance of 1,500 feet, by mules; 9 men and 1 mule employed on the inside work.

Inspections made February 8, June 20, September 26.

OVERTON COUNTY.

Overton Mine—*Owner and Operator*, Overton Coal & Coke Co., Davidson; *President*, Robert Officer, Livingston; *Superintendent*, Irvin Allred, Davidson; *Inside Foreman*, W. N. Pope, Davidson.

This is a Class C drift mine, opened up in the Bon Air seam, which has an average thickness of 5 feet, and an altitude of 1,668 feet above sea level. It is situated 2 miles northwest from Highland Junction, a station on the Wilder branch line of Tennessee Central Railroad, $19\frac{1}{2}$ miles from Monterey. The development is on the single entry system. The roof is hard slate, and the bottom hard rock. Generally speaking, this is a damp mine, and dip headings are wet. The coal is hard, and the explosive used for blasting is black powder. The method of mining is principally by solid shooting. Ventilation is furnished by a small furnace, and conveyed to the working faces by doors and wooden brattices. The ventilating current is distributed as continuous current. An average of 25 men and 2 mules are employed on the inside. Coal is hauled from working places in mine to tippie, a distance of 800 feet, by mules; and from tippie to Highland Junction, over Davidson Lumber Company's Railroad, by locomotives.

Inspections made February 8, June 19, September 25, December 5.

OVERTON COUNTY.

Peacock Mine—*Owner*, Peacock Coal & Coke Co., Lebanon; *Operator*, J. C. Lusk, Monterey.

This is a Class D drift mine, opened up in the Bon Air seam, which has at this point an average thickness of 34 inches. This mine is located at Obey City, a station on the Crawford and Wilder branch line of Tennessee Central Railroad, 7 miles from Monterey. The elevation of this mine is 1,750 feet above sea level. The roof is slate, and the bottom fire-clay. Development is on the single entry system. This is in most parts a damp mine. The method of mining is by solid shooting with black powder. Ventilation is furnished by a small furnace, and conveyed to the working faces by doors and brattices. An average of 6 men and 1 mule are employed on the inside. Coal is hauled from rooms to tippie by mules.

Inspections made February 8, June 20, December 6.

RHEA COUNTY.

Fox No. 2 Mine—*Owner and Operator*, Durham Coal & Iron Co., Chattanooga; *President*, C. B. Eddy, Chattanooga; *Superintendent*, J. H. Jones, Soddy; *Inside Foreman*, H. G. Smith, Graysville.

This is a Class A drift mine, with an elevation of 1,250 feet above sea level. It is opened up in the Richland No. 5 seam, which has at this point an average thickness of 3 feet. This mine is located in Walden's Ridge, about $2\frac{1}{2}$ miles northwest from Graysville. The roof is slate, and in some sections is very dangerous. The bottom

is slate and hard rock. Generally, the working faces of this mine are damp, but the roadways are inclined to be dry in some places. The coal is irregular in formation, squeezes confining it mostly in pockets or "swags". The coal is of a soft nature, and is very dirty in some sections. It is developed on the double entry method. It is mined by solid shooting, black powder being the explosive used. Ventilation is produced by a 12-foot Crawford & McCrimmon exhaust fan, with steam connection, and is conveyed throughout the development by means of doors and brattices of wood, and is distributed by the split system. The work performed is confined principally to drawing stumps and pillars. An average of 44 men and 12 mules are employed on the inside work. Coal is hauled from working places to sidetrack by mules, and from sidetrack to head of incline on outside, a distance of 3,300 feet, by main and tail rope; and from head of incline to foot, a distance of 450 feet, by drum with steam connection; and from foot of incline to washer, a distance of 3,960 feet, by dinky locomotive; and from washer to Graysville Station, on Queen & Crescent Railroad, a distance of 11,000 feet, by locomotive.

Inspections made April 2, June 7, August 19, October 23.

RHEA COUNTY.

Prospect Mine—*Owner and Operator*, Dayton Coal & Iron Co. (Limited), Dayton; *General Manager*, L. C. Crewe, Dayton; succeeded by H. F. Noise, September 15, Dayton; *Superintendent*, W. N. Holden, Dayton; succeeded by J. D. Stansbury, November 1, Dayton; *Inside Foreman*, J. C. Presnell, Dayton; *Gas Boss*, H. C. Morgan, Dayton; *Assistant Gas Boss*, William Washburn, Dayton, R. F. D. 5.

This is a Class A slope mine, located in the base of Walden's Ridge, 2 miles north from Dayton. It is developed in the Nelson seam, which has an altitude at this point of 840 feet above sea level, and an average thickness of 36 inches. The seam at this point is very irregular in formation, and has bands of slate and sandstone, varying in thickness from 1 to 6 inches, distributed through it. The roof is a mixture of slate and sandstone shale, and the bottom fire-clay and sandstone. It is developed on the single entry system, and by numerous cross and sub entries. In some sections of the mine small quantities of explosive gas are liberated. A large quantity of water is liberated in parts of this mine, but other sections of it are inclined to be dry, and sprinkling with water is required to allay the dust. The coal is of a soft nature, and the method of mining is by solid shooting with permissible explosives (monobel). Ventilation is produced by an 8-foot Thayer disc fan, and is distributed by the split system, and conducted to the working faces by means of wooden stoppings. An average of 75 men and 16 mules are employed on the inside work. Haulage is conducted from rooms and other working places to sidetrack by mules; and from third right main siding to siding at foot of slope, a distance of 1,600 feet, by main and tail rope; and from sidetrack at foot of slope to tippie, a distance of 1,550 feet, by drum and rope, with steam connections.

Inspections made February 22, April 29, July 29, September 30, December 2.

ROANE COUNTY.

McLean Mine—*Owner and Operator*, Roane Iron Co., Rockwood; *President*, H. S. Chamberlain, Chattanooga; *Mine Superintendent*, W. J. Richards, Rockwood; *Inside Foreman*, Walter Kelly, Arbutus.

This is a Class A slope mine, located on the Cumberland Plateau, 4 miles from Rockwood. It connects with the Tennessee Central Railroad. The Sewanee seam is worked. Thickness irregular with an average of 48 inches. Development by double entry and modification of room and pillar system. The roof is slate, the bottom fire-clay. Ventilation by fan 10 feet in diameter. Haulage by mule to slope, and by rope to tippie. Length of slope 1,800 feet.

Inspections made February 22, May 7, August 19, October 16, December 7.

ROANE COUNTY.

Rockwood Mine—*Owner and Operator*, Roane Iron Co., Rockwood; *President*, H. S. Chamberlain, Chattanooga; *Superintendent of Mines*, W. J. Richards, Rockwood; *Inside Foreman*, W. T. Richards, Rockwood; *Assistant Foremen*, W. H. Elliott and James King; *Gas Bosses*, W. C. Wright, Tom Lane, R. Kelly and W. Tauscher, Rockwood.

This is a Class A slope mine, located 1,080 feet above sea level at the base of Walden's Ridge, and extending under the Cumberland Plateau. It is 1 mile from Rockwood, and has connection by the Roane Iron Company's tracks with the Tennessee Central and C. N. O. & T. P. railroads. No coal, however, is shipped, all of it being coked at the mines with the exception of a small amount used locally. The coal worked is the Sewanee seam; the seam at this point is very irregular, having an average thickness of about 48 inches. The top is slate, the bottom fire-clay or sandstone. The mine is developed by three entries on the double entry system, and by numerous cross entries, slopes and haulways from same. The mining is done on a modification of the room and pillar system. Ventilation is by split system, from a fan 20 feet in diameter. Haulage by mules; also by gravity plane, and air engine, with ropes on slopes to side-track; and by gasoline locomotives on the main entries to main slope, and thence by rope on slope. Average distance of motor haul on entries $1\frac{1}{2}$ miles; length of slope 5,000 feet.

Early in the year a second engine was added to the fan, with larger steam connection, increasing speed and water gauge. The development during the year has been mostly on the pitch of the seam by slopes and cross-entries instead of increasing length of main entries.

Inspections made January 23, April 26, May 11, October 12.

SCOTT COUNTY.

Glen Mary Mine—*Owner and Operator*, Glen Mary Coal & Coke Co., Glen Mary; *President*, Gus Carter, Glen Mary; *Inside Foreman*, J. M. Carson, Glen Mary.

This mine is located about 4 miles southeast from Glen Mary Station on the Queen and Crescent Railroad, and is connected with this road by branch line. It is a Class C drift mine, composed of a number of little openings in the same seam and under the same management, and the coal passing over the same tippie. There is no well defined system of either development or ventilation in this mine at present, as robbing is principally the work, and both furnace and natural ventilation being used. These mines in most sections are damp, and in some parts are wet. The roof is generally slate, and the bottom hard fire-clay. Solid shooting with black powder is the method of mining generally used. These mines employ 54 men and 11 mules on the inside. Coal is hauled from working places in the mines to outside sidetracks by mules, and from these sidetracks to tippie, a distance from most extreme mine of 3 miles, by dinky locomotive; and from tippie to Glen Mary Station, a distance of 1 mile, by locomotive.

Inspections made April 8, July 18, October 17.

SCOTT COUNTY.

Oneida Mine—*Owner*, Paint Rock Coal Co., Harriman; *Operator*, Terry Coal Co., Oneida; *General Manager*, A. C. Terry, Oneida.

This is a Class B drift mine, consisting of a number of small openings near each other, the coal passing over the same tippie. It is located on a spur line of the Tennessee Railroad, about 4 miles east from Oneida. This mine is operated in the Paint Rock seam, which has an average thickness of 26 inches, and an altitude of 1,450 feet above sea level. The roof is slate, and the bottom sandstone. There is no well defined method of development or system of ventilation, as the work consists principally of robbing, and ventilation is furnished mainly by natural conditions. Generally, these openings are damp, but dust of a dangerous character is found in some places. Coal is mined principally by solid shooting with black powder. Haulage is conducted from working places to tippie by mules, and from tippie by locomotive. An average of 21 men and 4 mules are employed on the inside.

Inspections made March 28, July 16, October 14.

SCOTT COUNTY.

Paint Rock No. 1 Mine—*Owner*, Paint Rock Coal Co., Harriman; *Operator*, R. A. Woods, Oneida; *Inside Foreman*, Jerry Connors, Laxton.

This mine is located on the Tennessee Railroad, about 5 miles east from Oneida. It is a Class B drift mine, operated in the Paint Rock seam, which has an average thickness of 26 inches, and an altitude of 1,250 feet above sea level. This mine

is opened up on the single entry, room and pillar plan. Ventilation is produced by a furnace with a grate area of 48 feet, and distributed as continuous current. The ventilating current is conveyed to the working places by means of doors and wooden stoppings. The roof is slate, and the bottom hard rock. Some portions of this mine is damp, but in most places it is dry and dusty, and necessitates watering to allay the dust. The method of mining is generally by solid shooting with black powder, heavy charges being required to break the coal. An average of 13 men and 2 mules are employed on the inside work. Haulage is conducted from working places to tippie, a distance of 4,000 feet, by mules; and from tippie to Oneida Station, on the Queen and Crescent Railroad, by locomotives, over the Tennessee Railroad.

Inspections made March 27, July 16.

SCOTT COUNTY.

Paint Rock No. 3 Mine—*Owner*, Paint Rock Coal Co., Harriman; *Operator*, R. A. Woods, Oneida; *Inside Foreman*, Jerry Conners, Laxton.

This is a Class B drift mine, developed in the Paint Rock seam, which has an average thickness of 26 inches, and an elevation of 1,400 feet above sea level. This mine is located on the Tennessee Railroad, about 5 miles from Oneida Station, on the Queen and Crescent Railroad. The roof is slate, and the bottom rock. It is operated on the single entry plan. Ventilation is by natural conditions. The method of obtaining the coal is principally by solid shooting, the explosive used being black powder. An average of about 8 men and 1 mule are employed on the inside. Coal is hauled from working places to tippie by mules, and from tippie by locomotives over the Tennessee Railroad to Oneida.

Inspection made March 27. This mine has been operated but little during the year.

SCOTT COUNTY.

Phillips Mine—*Owner and Operator*, Virginia Mining Co., Roberta; *President*, L. E. Bryant, Roberta; *Inside Foreman*, A. Laxton, Roberta.

This mine is situated 3 miles north of Oneida, and connects by branch line with Queen and Crescent Railroad at Bear Creek Junction. It is a Class C drift mine, and has an elevation of 1,400 feet above sea level. The seam operated is the No. 4, having an average thickness of 30 inches, with a bone strata or middle slate, varying in thickness from 3 to 15 inches, which adds greatly to the expense of development. The roof is slate, and the bottom fire clay. This is a damp mine in most parts, while some parts are wet. It is developed on the single entry, room and pillar system. The ventilating current is furnished by two electric fans, and distributed to working faces by means of doors and wooden brattices. Coal is all undercut with electric mine machines of the chain type, and broken down with black powder. This mine employs an average of about 33 men on the inside work. Coal is gathered and hauled from working places to tippie, a distance of 2,000 feet, by electric motors.

Inspections made March 26, July 17, October 15.

SCOTT COUNTY.

Pine Knot Mine—*Owner*, Paint Rock Coal Co., Harriman; *Operator*, Pine Knot Coal Co., Oneida; *President*, D. Denny, Harriman; *Inside Foreman*, George Chambers, Laxton.

This is a Class C drift mine, consisting of two little openings near each other and operating in the Paint Rock seam, which has an average thickness of 24 inches. This mine is located on the Tennessee Railroad, about 6 miles from Oneida, and has an elevation of 1,340 feet above sea level. The development is on the single entry, room and pillar plan. The ventilating current is furnished by small furnaces, and natural means. The roof is slate, and the bottom hard rock. This is a damp mine. The coal is hard, and the method of mining is by solid shooting with black powder, requiring heavy charges to break the coal. An average of 17 men and 1 mule are employed on the inside work. Coal is hauled from working places to tippie by mules, and from tippie by locomotive on spur line to Jakes Tank on Tennessee Railroad.

Three inspections made. March 27, July 16 and October 14.

SCOTT COUNTY.

Rosser Mine (Flat Top)—*Owner and Operator*, Virginia Mining Co., Roberta; *President*, L. E. Bryant, Roberta; *Inside Foreman*, A. Laxton, Roberta.

This is a Class C drift mine, operated in the No. 4 seam, which has an average thickness of 42 inches. It is located 2½ miles southwest from Winfield, and connects by branch line with Queen and Crescent Railroad, at Bear Creek Junction. It is opened up on the single entry, room and pillar system. Generally, this is a damp mine. The roof is slate, and the bottom fire-clay. This seam has a slate band in the middle, varying in thickness from 3 to 8 inches. The ventilating current is furnished by a 42-inch electric exhaust fan, and conveyed to headings and other working places by doors and brattices. All coal is undercut with electric mine machines, and black powder is used for blasting purposes. An average of about 20 men are employed on the inside work. Coal is gathered and hauled from working places to tipple, a distance from most extreme workings 3,000 feet, by electric motors.

Inspections made March 26, October 15.

SCOTT COUNTY.

Southern Clay Mine—*Owner and Operator*, Southern Clay Mfg. Co., Chattanooga; *President*, W. M. Lasley, Chattanooga; *Inside Foreman*, J. C. Pemberton, Robbins.

This mine is located at Robbins, on the Queen and Crescent Railroad. It is a Class D drift mine, operated in the Glen Mary No. 4 seam, having an average thickness of 20 inches, and an altitude of 1,400 feet above sea level. The roof is slate, and the bottom fire-clay. It is developed on the single entry, room and pillar plan. This is a damp mine, and the coal is of soft nature, and solid shooting with black powder is generally practiced. The ventilating current is produced by a small furnace, and is conveyed through the workings by doors and wooden stoppings, and is generally poorly distributed. An average of 13 men and 1 mule are employed on the inside work. The coal is rather dirty, and is used by the operating company for heating brick kilns. Coal is hauled from working places to tipple by mules.

Inspections made April 15, October 16.

SCOTT COUNTY.

Stanley Nos. 1 and 2 Mine—*Owner*, Paint Rock Coal Co., Harriman; *Operator*, Stanley Coal Co., Oneida; *Superintendent*, A. McDonald, Harriman.

This mine is located about 4 miles east of Oneida, a station on the Queen and Crescent Railroad, and connects with that railroad at Oneida by the Tennessee Railroad. It is a Class B drift mine, operated in the Paint Rock seam, which has an average thickness at this point of 30 inches. The elevation of this mine is 1,300 feet above sea level. It is developed on the single entry plan. The roof is slate, and the bottom hard rock. The coal is of a dry and dusty nature, but the bottom is generally damp. The method of mining is by solid shooting, with black powder. Ventilation is produced by a small furnace and natural means. This mine consists of 3 little openings near each other, and operated by the same management. An average of 17 men and 2 mules are employed on all the inside work. Coal is hauled from working places in the mine to tipple, by mules; and from tipple to Oneida, over Tennessee Railroad, by locomotives.

Inspections made March 28, July 16, October 14.

SCOTT COUNTY.

West Hollow Mine—*Owner and Operator*, Virginia Mining Co., Roberta; *President*, L. E. Bryant, Roberta; *Inside Foreman*, G. W. Strunk, Roberta.

This mine is situated about 2 miles southwest from Winfield Station, on Queen and Crescent Railroad, and connects with that line by branch line, at Bear Creek Junction. This is a Class D drift mine, operated in the No. 4 seam, which has an average thickness of 30 inches, and an altitude of 1,400 feet above sea level. The roof is slate, and the bottom fire-clay. This mine consists of four little openings in a few hundred feet of each other, and operated over the same tipple. This is a very wet mine, and the haulways are muddy. The coal seam has a middle slate band through it, varying in thickness from 2 to 6 inches, which adds greatly to the expense of operating the mine.

It is opened up on the single entry method. The ventilating current is furnished by a 42-inch electric fan, and is by continuous current. Coal is undercut by electric mine machines, and broken down by blasting with black powder. Haulage is with mules, from rooms to tippie, a distance of 500 feet.

Inspections made March 26, July 17. Operations suspended indefinitely in latter part of July.

SCOTT COUNTY.

Wilson Mine—*Owner and Operator*, Virginia Mining Co., Roberta; *President*, L. E. Bryant, Roberta; *Inside Foreman*, Alex. Hall, Roberta.

This is a Class C drift mine, and is composed of 5 openings near each other, and which are to have an underground connection, and operated over the same tippie. It is located about 3 miles southwest from Windfield Station on the C. N. O. & T. P. Railroad, and connects with that railroad by branch line at Bear Creek Junction. It is developed in the No. 4 seam, which has at this point an average thickness of 36 inches. This seam has a middle band of slate, with an average thickness of 12 inches, which greatly deters development. It is opened up on the single entry plan. This is a damp mine, and has no dust of a dangerous character. The ventilating current will be furnished by electric fans. The coal is all undercut with electric mine machines and broken down with black powder; 22 men are employed on the inside work. Coal is hauled from headings and other working places to tippie, a distance of about $\frac{1}{2}$ mile, by electric motors.

Inspection made October 15. This is a new mine and is still in the outcrop.

SEQUATCHIE COUNTY.

Douglas No. 2 Mine—*Owner*, Southern I. & S. Co., Birmingham, Ala.; *Operator*, C. E. Buek, Receiver, Chattanooga; *Superintendent*, John M. Smith, Dunlap; *Inside Foreman*, John Dagnan, Dunlap.

This is a Class C drift mine, developed in the Sewanee seam, which has at this point an average thickness of 48 inches. It is situated high up in Cumberland Mountain, 1 mile northward from Dunlap Station, and has an altitude of 1,667 feet above sea level. The roof is generally slate, but in some sections it is a sandshale, in others it is a hard sandstone. The bottom is of a fire-clay nature in most sections. It is developed on the double entry, room and pillar system. This is generally a damp or moist mine, while some parts of it are very wet. The coal is of a soft nature, and in some divisions of the mine, has a slaty strata or band, known locally as "a middle man", varying in thickness from 3 to 10 inches; while in other sections the coal is clean. The method of mining is principally by solid shooting with black powder. Ventilation is furnished by a 12-foot Crawford and McCrimmon exhaust fan, and is distributed by the split system, and conveyed to headings and other working places by means of doors and wooden brattices. An average of 130 employes and 12 mules are worked on the inside. Coal is hauled from working places to sidetrack by mules; from sidetrack to mine entrance, a distance of 5,200 feet, by main and tail rope; from mine portal to tippie, a distance of 3,900 feet, by dinky locomotive; and from tippie to chute at foot of incline, a distance of 3,900 feet, by gravity drum; and then to Dunlap Station, on N. C. & St. L. Ry., by locomotive.

Inspections made January 23, April 24, July 23, November 12.

WHITE COUNTY.

Bon Air No. 6 Mine—*Owner*, Bon Air Coal & Iron Co., Nashville; *Operator*, Robert Vaughn and E. C. Lewis, Receivers, Nashville; *Superintendent*, W. F. Dibrell, Bon Air; *Inside Foreman*, David McKay, Bon Air.

This is a Class C drift mine, located about $\frac{1}{2}$ mile from Bon Air Station, and connects with the N. C. & St. L. Ry. It is opened up in the Bon Air seam, which has an average thickness of 3 feet, and an elevation of 1,646 feet above sea level. The roof is slate, and the bottom fire-clay. This mine is damp, and the method of mining is by solid shooting with black powder. This mine has no well defined system of work, as it consists of three openings, and robbing being the only work. Ventilation is furnished by fan and natural conditions. An average of 23 men and 4 mules are employed on the inside. Coal is hauled from working places to tippie by mules.

Inspections made March 19, July 9, October 9, December 17.

WHITE COUNTY.

Bon Air (Shaft) Mine—*Owner*, Bon Air Coal & Iron Co., Nashville; *Operator*, Robert Vaughn and E. C. Lewis, Receivers, Nashville; *Superintendent*, W. F. Dibrell, Bon Air; *Inside Foreman*, S. A. Rhinehart, Bon Air.

This is a Class C shaft mine, operating in the Bon Air seam, which has an average thickness of 3 feet, and an elevation of 1,857 feet above sea level. It is located 1½ miles east from Bon Air Station, on N., C. & St. L. Ry. It is developed on the double entry, room and pillar system. Generally, this is a damp or moist mine, but some portions a little dry. The roof is slate, and the bottom hard fire-clay. Coal is undercut with electric mining machines of the chain type and broken down with small charges of black powder. Ventilation is furnished by a 15-foot Buffalo exhaust fan, propelled by steam, and distributed by the split system and conveyed to rooms and headings by wooden stoppings and overcasts. An average of 78 men are employed on the inside. Coal is hauled from working faces to shaft landing by electric motors, and from shaft landing to tippie, a distance of 212 feet, by steam hoist.

Inspections made March 19, July 9.

WHITE COUNTY.

Clifty Creek No. 3 Mine—*Owner and Operator*, Clifty Consolidated Coal Co., Clifty; *President*, R. R. Moody, Springfield, Mass.; *General Manager*, Dr. Young, Clifty; *Superintendent*, C. W. Bell, Clifty; *Inside Foreman*, J. L. Ledford, Clifty.

This is a Class C drift mine, developed in the Sewanee seam, which has an average thickness of 42 inches, and an elevation of 1,600 feet above sea level. It is located about ¾ mile southwest from Clifty Station, on the Nashville, Chattanooga and St. Louis Railway. It is opened up on the double entry, room and pillar system. The roof is slate and shale, and is of a dangerous character and unusually bad in some sections, and requires careful attention as to timbering to make it safe. The bottom is of a fire-clay nature. The coal is of a soft nature, and the method of mining is chiefly by solid shooting with black powder. No dust of a dangerous character is found in any section of the mine. Generally, this is a damp mine, with some parts rather wet. Ventilation is furnished by a furnace with 15 feet grate area, and the current is by the split system, and conveyed to the headings and other working places by means of doors and wooden stoppings, and is generally very poorly distributed and deficient. An average of 79 men and 11 mules are employed on the inside work of this mine. Haulage is conducted from working places to tippie, an average distance of about 2,000 feet, by mules.

Inspections made March 20, July 10, October 10, December 18.

WHITE COUNTY.

Clifty Creek No. 1 Mine—*Owner and Operator*, Clifty Consolidated Coal Co., Clifty; *President*, R. R. Moody, Springfield, Mass.; *General Manager*, Dr. Young, Clifty; *Superintendent*, C. W. Bell, Clifty; *Inside Foreman*, J. L. Ledford, Clifty.

This mine is located ¾ mile northwest from Clifty Station, on Nashville, Chattanooga and St. Louis Railway. It is a Class C drift mine, operating in the Sewanee seam, which has an average thickness of 36 inches, and an altitude of 1,600 feet above sea level. The roof is hard sandstone and is generally very regular in formation, good and very safe, and the bottom fire-clay. The coal is hard and generally of a good quality. The method of mining is mostly by solid shooting with black powder. This is a damp or moist mine in all parts, and some sections of it are very wet, and on account of local conditions, some of the working places and important haulways are very difficult to properly drain. It is developed on the double entry and single room system. Ventilation is furnished by a furnace with a grate area of 50 feet, and distributed to the working faces by means of doors and other wooden stoppings. The ventilating current (15,010 cubic feet per minute) is by the split system and well conducted throughout the development. An average of 55 men and 6 mules are employed on the inside of this mine. Haulage is conducted from headings and other working places to tippie, a distance of 4,500 feet, by mules.

Inspections made March 20, July 10, October 10, December 18.

WHITE COUNTY.

Eastland No. 1 Mine—*Owner*, Bon Air Coal & Iron Co., Nashville; *Operator*, Robert Vaughn and E. C. Lewis, Receivers, Nashville; *Inside Foreman*, George Thom, Sr., Eastland.

This is a Class C drift mine, located at Eastland, and connects with the Nashville, Chattanooga and St. Louis Railway. It is opened up and developed in the Sewanee seam, which has an average thickness of 4 feet, and an altitude of 1,800 feet above sea level. It is developed on the single entry, room and pillar system. The roof is slate and shale, and the bottom fire-clay. Ventilation is furnished by a 17-foot Vulcan exhaust fan, and distributed by the split system. The inlet current is conveyed to the headings and other working places by means of doors and other wooden stoppings. Most parts of this mine are very damp, and in some sections the main haulway is wet and muddy. The method of mining is chiefly by solid shooting with black powder. An average of 60 men and 9 mules are employed on the inside work of this mine. Haulage is conducted from working faces to yard on outside, a distance of over 2,000 feet, by mules, thence with car, with endless rope, up incline, 195 feet to tippie.

Inspections made March 20, July 10, October 10, December 18.

WHITE COUNTY.

Ravenscroft Mine—*Owner*, Bon Air Coal & Iron Co., Nashville; *Operator*, Robert Vaughn and E. C. Lewis, Receivers, Nashville; *Superintendent*, W. F. Dibrell, Bon Air; *Inside Foreman*, George Thom, Jr., Ravenscroft.

This is a Class C shaft mine, operating in the Bon Air seam, which has an average thickness of 54 inches, and an elevation of 1,879 feet above sea level. It is located at Ravenscroft, and connects with N., C. & St. L. Ry. Generally, the roof is sandstone, but in some sections of the mine the coal is overlaid with a draw slate, varying in thickness from 3 to 10 inches. It is developed on the double entry, double room and pillar system. Most of the coal is undercut with compressed air mining machines of the puncher type, and broken down with black powder. This is in general a very wet mine, and requires 18 pumps of various sizes going to keep the water out. Ventilation is produced by a 10-foot Capelle exhaust fan, with steam connections, and is distributed through the development by the split system. An average of 133 men and 17 mules are employed on the inside. Haulage is conducted from rooms and other working places to sidetrack by mules; and from sidetrack to cage landing, a distance of 1,300 feet, by main and tail rope; and from cage landing at bottom of shaft to top, a distance of 187 feet, by steam hoist.

Inspections made March 21, July 11, October 11, December 19.

IRON MINES

CAMPBELL COUNTY.

Slope No. 3 Mine—*Owner*, Lafollette Coal, Iron & Ry. Co., Lafollette; *Operator*, Lafollette Iron Co., Lafollette; *President and General Manager*, H. P. Howe, Lafollette; *Superintendent*, J. S. Patterson, Lafollette; *Inside Foreman*, Frank Swartzman, Lafollette.

This is a Class D slope mine, working an upright seam of ore. It is located $2\frac{1}{2}$ miles from Lafollette, and connects with the Southern Railway. Its elevation is about 1,100 feet above sea level. The Red Hematite seam, with an average thickness of 48 inches, is worked. Both the roof and bottom are slate. It is developed by a slope which is driven to a depth of 250 feet, first level being driven off from slope about 250 feet. The ore is worked above this level by driving a hole, fixing a gate in same, to catch the ore which is shot down from above and drawn out into mine cars. Haulage is conducted from chutes to bottom of slope, a distance of from 50 to 250 feet, by mules from bottom of slope to outside chute, a distance of 300 feet, by rope; here it is dumped in chute and drawn into tram cars and hauled a distance of about 8,000 feet by mules to chute at railway.

CAMPBELL COUNTY.

Senica Mine—*Owner*, Lafollette Coal, Iron & Ry. Co., Lafollette; *Operator*, Lafollette Iron Co., Lafollette; *President and General Manager*, H. P. Howe, Lafollette; *Superintendent*, P. S. Patterson, Lafollette; *Inside Foreman*, Frank Swartzman, Lafollette.

This is a Class D drift mine, and is mining surface ore. It is located in a valley about two miles from Lafollette, and connects with the Louisville and Nashville Railroad. Its elevation is about 1,100 feet above sea level. The Red Hematite seam, with an average thickness of 48 inches, is worked. Both the roof and bottom is composed of slate. It is developed on the room and pillar system, and has natural ventilation. Haulage is conducted from rooms to outside, a distance of from 300 to 400 feet, by mules; from outside to tippie a distance of 4,000 feet, by mules.

MEIGS COUNTY.

Crescent Ore Mine—*Owner and Operator*, Dayton Coal & Iron Co. (Limited), Dayton; *General Manager*, L. C. Crewe, Dayton, succeeded by H. F. Noyes, September 15, Dayton; *Mine Foreman*, B. F. Swift, Euchee.

This ore mine is located on the Tennessee River, in the northwestern part of the county. It is a slope mine, operating in a vein of red hematite ore, with an average thickness of about 54 inches. While the formation of this seam is not regular, it is more uniform than the vein worked at Rockwood. The slope angle is with the dip of the ore seam, and is on a grade of 23 degrees to the southeast. The roof in most places is a slate of a very troublesome character, and requires careful timbering to keep it safe and secure. The bottom is hard rock. Generally speaking this mine is damp, and in some parts is wet. The plan of development in general is by cross entries from main slope. Ventilation is furnished by natural conditions, and is ample for the men and mules employed. The explosive used for blasting purposes is dynamite. An average of 47 men and 5 mules employed on the inside work. The output of this mine is used in the production of pig iron, by the Dayton Coal & Iron Co. (Limited), at their furnaces at Dayton. Haulage is conducted from headings and other working places to main slope by mules; and up main slope to tippie, a distance of 1,200 feet by steam hoist; and from tippie to dock on river, a distance of 2,000 feet, by dinky engine; from dock to landing at Dayton, by steamboat; and from Dayton landing to furnaces, a distance of 3 miles, by locomotives on their own railroad line.

Two inspections made. April 12 and September 5.

ROANE COUNTY.

Brown Mining Co.'s Iron Ore Mines—*Owner*, Roane Iron Co., Chattanooga; *Operator*, Brown Mining Co., Cardiff; *President*, J. F. Tarwater, Rockwood; *General Managers*, J. P. Tarwater and Sewel Howard, Rockwood; *Inside Foremen*, Charles Bowling and Sanford Ingram, Rockwood; J. A. Tidwell and A. C. Montgomery, Hariman, R. F. D. No. 1; I. S. Montgomery, Cardiff; S. H. Bailly, Emory Gap.

This mining industry consists of a number of slope mines, extending in a northeast line from Rockwood, along the foot of Walden's Ridge to Emory Gap, a distance of 6 miles. The seam or vein worked is the red hematite, varying in thickness from a few inches to several feet, with a general average of about four feet. In position, this seam is almost perpendicular, the dip or slope angle, inclining slightly to the northwest. The formation of this vein is greatly disturbed; in many places the folds or flexures have been separated or dislocated, and have fallen out of their former connections, suddenly disappearing, and which may be found higher or lower on the other side of the fracture. In some sections the ore seam is uniform, in other parts it is confined to small pockets, and still in other portions it will split and divide into very thin and irregular strata or layers. The bottom wall rock is very hard, known locally as "jack-rock." The top is a slate, and is generally fairly good, but in some places is very treacherous and requires careful timbering. In some of the lower levels the walls are of such nature that they can not be timbered and held apart long enough to take out the ore. Some portions of these mines are very wet, while other parts are dry. The method of development in general is by the entry and air course system, but no defined plan is strictly adhered to. Ventilation is produced mostly by natural conditions, and is generally sufficient. The explosive used is principally black powder. An average

of 235 men and 41 mules are employed on the inside work of these mines, producing a daily average of about 500 tons of ore. The output of these mines is used in the production of pig iron, by the Roane Iron Co., at their blast furnaces at Rockwood. Haulage is by mules and air engine, with ropes on interior slopes to main slope; and by steam hoist from the different levels to outside in 1½-ton cars, two cars being hoisted at a time. The ore is dumped on to specially constructed tables, and all the slate and rock separated from it by hand before it is tipped into railroad cars to be transferred to furnaces.

Two inspections made. April 9, 10 and 11, September 3 and 4.

COPPER MINES

POLK COUNTY.

Copper Mines—The copper mines of Tennessee are located in Polk County in the extreme southeast corner of the State, the section in which they are located being known as the Ducktown basin.

There are two companies operating in the basin—the Tennessee Copper Co. and the Ducktown Sulphur, Copper & Iron Co.

Each company maintains its own system of railroads from its mines to their smelters, that of the D. S. C. & I. Co. being located at Isabella, and the smelter of the Tennessee Copper Co. at Copper Hill. Both companies connect with the Louisville and Nashville Railroad at Copper Hill.

The ore body, though somewhat irregular, lies for the most part at a pitch of 70 to 80 degrees to the east, with varying thickness up to more than 100 feet in places. The ore is a sulphide, comparatively low grade as to copper, but with a considerable amount of iron and sulphur.

The Tennessee Copper Co. operates three mines—the Polk County mine, the Burra Burra mine, and the London mine. The Ducktown Sulphur, Copper & Iron Co. operates two—the Mary mine and the East Tennessee mine.

POLK COUNTY.

Polk County Mine—*Owner and Operator*, Tennessee Copper Co., Copper Hill; *General Manager*, A. H. Case, Copper Hill; *Superintendent*, M. A. Caine, Copper Hill; *Foreman*, J. W. Edwards, Copper Hill.

This mine lies about two miles from Copper Hill, railroad connections on the Tennessee Copper Co.'s line. The mine is operated by a vertical shaft 485 feet deep, with working levels every 100 feet. Mining is done by the underhand stoping system.

This mine was shut down for some time during the latter part of the year to overhaul the shaft timbering and put in new head frame and ore handling plant.

The mine was inspected on June 4, also visited on October 1, and found not in operation.

POLK COUNTY.

Burra Burra Mine—*Owner and Operator*, Tennessee Copper Co., Copper Hill; *General Manager*, A. H. Case, Copper Hill; *Superintendent*, M. A. Caine, Copper Hill; *Foreman*, Charles Skullman, Ducktown.

This mine is located at Ducktown, and is the largest in the district, with a capacity of something over 1,000 tons per day. It has an incline shaft 870 feet deep on the pitch of the vein. Balanced skips are used, one of which is interchangeable with a man cage for lowering and hoisting the men. The shaft is lined with concrete at and near the surface, with iron fire doors, which can be lowered in case of fire in the outside plant. The mine is worked in 8 levels. The 6th level connects with what is known as the McPherson shaft, and there are several other connections from the upper levels to the surface.

Most of the mining is being carried on by what is known as overhead or shrinkage stoping on timbers. In this system a sill floor the width of the vein is taken out at the

level; parallel sets of heavy double timbers are then set, and the ore from the roof above is then broken down on the timbers. Using this broken ore to work on, the stope is then worked up about 70 feet, or to 30 feet of the level above. As the broken ore occupies more space than the ore in place, a certain amount must be continually drawn off below to keep the stope from filling up. After working up to the desired height, the whole body of broken ore is then withdrawn. In this mine also some of the "backs" on the upper levels are being successfully recovered by a system of filling with waste from the surface.

This mine was inspected twice, on June 6 and October 2.

POLK COUNTY.

London Mine—*Owner and Operator*, Tennessee Copper Co., Copper Hill; *General Manager*, A. H. Case, Copper Hill; *Superintendent*, M. A. Caine, Copper Hill; *Foreman*, A. N. Shepherd, Ducktown.

This mine lies about one-half mile north of Ducktown. It is worked by an inclined shaft 650 feet deep, the last 100 feet to the 6th level having been sunk this year.

The system of mining is mostly by underhand stoping, although timber is being put in place for overhead stoping in some of the lower levels. The output of this mine is much smaller than the Burra Burra.

The mine was inspected twice, on June 6 and October 2.

POLK COUNTY.

Mary Mine—*Owner and Operator*, Ducktown Sulphur, Copper & Iron Co., Isabella; *General Manager*, C. W. Renwick, Isabella; *Superintendent and Foreman*, A. Bennett, Copper Hill.

This mine lies just to the north and adjacent to Polk County mine, being a little more than two miles from Copper Hill. The mine is operated by three shafts, the principal one being known as the Gorden shaft, the others as the Baxter and No. 2 shafts. All of these shafts are used for hoisting ore, the greater output, however, coming from the Gorden shaft. They are all connected at various levels.

The Gorden shaft is 830 feet deep and has 9 levels; Baxter shaft 350 feet deep with 4 levels, and No. 2 shaft about 500 feet deep with 4 levels. Each is vertical, and all have safety dogs on cage and overwind device.

The system of mining is underhand stoping, the ore being delivered through winzes to tramping places below. The tramways are for the most part cut in the wall rather than in the vein matter, the men at the loading places being protected from the ore above, and very little trimming being done under high stopes.

The mine was inspected twice, on June 6 and October 1.

POLK COUNTY.

East Tennessee Mine—*Owner and Operator*, Ducktown Sulphur, Copper & Iron Co., Isabella; *General Manager*, C. W. Renwick, Isabella; *Superintendent*, A. Bennett, Copper Hill; *Foreman*, J. I. Quinn, Isabella.

This mine is the most northern operation in the basin. It is developed by a vertical shaft about 700 feet deep, having 9 levels, several of which are, however, abandoned. The shaft has safety dogs on cage and overwind device.

The mining is underhand stoping, with some development work. It is at present a small operation, the average number of men employed being about 25.

The mine was inspected twice, on June 6 and October 3.

PHOSPHATE MINES

LEWIS COUNTY.

Mayfield Mine (Phosphate)—*Owner and Operator*, Charleston S. C. Mining & Mfg. Co., Mt. Pleasant; *Superintendent*, M. H. Wright, Gordonsburg; *Foreman*, James Mackey, Gordonsburg.

This mine is located at Gordonsburg, and has railroad connections with the Louisville and Nashville Railroad by a branch line to Mt. Pleasant.

The phosphate formation is a horizontal strata, principally blue rock, lying with outcroppings along the sides of low hills. The formation averages about 36 inches

thick, and is worked by drift mining on a single entry room and pillar system, much the same as a thin seam of coal. From 6 to 12 inches of the top of the formation is a softer rock of low grade. A mining is cut in this with radialax air punching machines, the cuttings being gobbled in center of room; the high-grade rock is then shot up with dynamite. The roof is a blue slate, the bottom limestone. The ventilation is natural, and as many of the entries run through the hills, appears to be sufficient. The top is good, and there seems to be little or no trouble from falls.

This mine was inspected once, on August 29.

ZINC MINES

KNOX COUNTY.

American Zinc Co.'s Mine—*Owner and Operator*, American Zinc Co. of Tennessee; *President*, H. S. Kimball, St. Louis, Mo.; *Superintendent*, G. T. Bridgman, Mascot; *Foreman*, T. McGoven, Mascot.

This is a shaft mine, one-half mile from Mascot Station, on the Southern Railway, and 14 miles from Knoxville.

The shaft is 380 feet deep, but the workings are from the 280 foot level. The ore body is a brecciated material composed of dolomite and limestone, and the ore is sphalerite or zinc blend.

This ore body is of considerable thickness, and lies on a slight dip. The mine is being developed on a system of main and cross entries, and the ore will be removed by a system of overhead stoping. Connection has been made with an old shaft or a former company about 270 feet from the main shaft, and ladder-way installed in same for second outlet. Natural ventilation is at present relied on, two additional air shafts, one on each side of mine, being projected. Development only is being done, material being hoisted in a bucket. A steel head frame with balanced skips and separate man-cage being projected.

This mine promises to be a modern and up-to-date mine in every respect, and when in operation will probably have a capacity of from 800 to 1,000 tons per day.

Two inspections made, May 31 and September 13.

JEFFERSON COUNTY.

Grasselli Chemical Co.'s Zinc Mine—*Owner and Operator*, Grasselli Chemical Co., New Market; *President*, C. A. Grasselli, Cleveland, Ohio; *Manager*, W. A. Underhill, New Market; *Foreman*, S. S. Mitchell, New Market.

This mine consists of a number of small operations of short life each, consisting of shaft 40 to 60 feet in depth, with series of tunnels and stopes. The formation consists of red clay on top of irregular dolomite rock. The ground is thoroughly prospected by bore holes, and shaft put down between the higher rock masses, or "pinnacles," as they are called. Drifting is then done in the clay following the ore which lies in the clay along the rock. These workings are necessarily very irregular, and being in the clay must be closely timbered and lagged, forepoling being necessary in all tunnel work. The ore is hoisted in buckets with small steam hoists, and hauled to the mill in carts. Natural ventilation is sufficient in most cases. Where more air is needed a bore hole is put down from the surface. Timbering is closely attended to and accidents are of seldom occurrence.

Mine inspected twice, May 31 and September 5.

MINERAL PRODUCTS OF TENNESSEE OTHER THAN COAL

This section of the report will be devoted to the mineral products of the State, other than coal. The statistics have been compiled and tabulated, showing the detailed production, usually by counties. Where the mineral is, or may become, an important one in this State, we have added such descriptive matter as we think will be of interest or value. For the purpose of comparison, we have added a number of tables showing the relative production of the various states, or countries. Much information of this character has not been given in this report for the reason that more comprehensive statistics can be obtained from "Mineral Resources of the United States," published by the United States Geological Survey.

BARYTES

PRODUCTION, CHARACTER, USES.

Production—The production of barytes in the United States in 1912, as shown by the U. S. Geological Survey, was 38,445 short tons, valued at \$122,792. Compared with the production of the preceding year, which was 42,975, valued at \$121,746, this was a decrease of 4,530 tons in quantity, but an increase in value of \$1,046.

The production in Tennessee for 1912 was 1,310 short tons, valued at \$1,782.

Character—Barytes, or heavy spar (BaSO_4), is composed of barium oxide (BaO), 65.7 per cent. The specific gravity of the mineral is from 4.3 to 4.6; its hardness varies from 2.5 to 3.5. It is usually a white opaque to translucent crystalline mineral about as hard as calcite, but differing from the latter by its greater specific gravity and the fact that it is perfectly inert when treated with acids.

Uses—The greater part of the barytes produced is used as a pigment in the manufacture of mixed paints. It is also used in the manufacture of lithapone, a white pigment, rubber, wall paper, asbestos cement, artificial ivory, such as poker chips, etc., and to some extent in the tanning of leather. However, its use for the manufacture of wall paper and leather is on the decline and has been used only to give weight to these products.

This table gives the total product and value of barytes produced in Tennessee for 1912 as compared with 1911.

Barytes product and value in Tennessee in 1912, compared with 1911.

COUNTY	1912						1911		INCREASE + OR DECREASE -	
	EMPLOYEES			PRODUCT			PRODUCT		Product (Short Tons)	Value
	Average Number	Average Wages Paid per Day	Total Wages Paid	Quantity (Short Tons)	Value	Value per Ton	Quantity (Short Tons)	Value		
Loudon.....							900	\$ 1,125	900	\$ 1,125
McMinn.....	5			290	\$ 374	\$ 1.29	1,164	1,446	874	1,072
Monroe.....	15			1,020	1,408	1.38	2,042	2,508	1,022	1,100
Total.....	20	\$ 1.03	\$ 1,488	1,310	\$ 1,782	\$ 1.36	4,106	\$ 5,079	2,796	\$ 3,297

The following table shows the production of crude barytes in the United States from 1910 to 1912, inclusive, together with the average price per ton:

Production of crude barytes in the United States, 1910-1912, by States, in short tons.

STATE	1910			1911			1912		
	Quantity	Value	Average Price per Ton	Quantity	Value	Average Price per Ton	Quantity	Value	Average Price per Ton
Missouri.....	22,978	\$75,598	\$3.29	21,500	\$81,380	\$3.79	24,530	\$117,035	\$4.77
Tennessee and Kentucky.....	6,503	13,348	2.05	8,819	20,053	2.27	3,718	8,682	2.34
Other States b.....	13,494	32,800	2.43	8,126	21,359	2.63	9,230	27,596	2.99
Total.....	42,975	121,746	2.83	38,445	122,792	3.19	37,478	153,313	4.09

a Production of Tennessee; no production of barytes reported for Kentucky in 1912.

b In 1910 and 1912, Georgia, North Carolina, and Virginia; in 1911, Georgia, North Carolina, South Carolina, and Virginia.

The following table gives the domestic production of crude barytes in short tons from 1883 to 1912, inclusive:

Production of crude barytes, 1883-1912.

	Short Tons		Short Tons
1883.....	30,240	1898.....	31,306
1884.....	28,000	1899.....	41,894
1885.....	16,800	1900.....	67,680
1886.....	11,200	1901.....	49,070
1887.....	16,800	1902.....	61,068
1888.....	22,400	1903.....	50,397
1889.....	21,460	1904.....	65,727
1890.....	21,911	1905.....	48,235
1891.....	31,069	1906.....	50,231
1892.....	32,108	1907.....	89,621
1893.....	28,970	1908.....	38,527
1894.....	23,335	1909.....	61,945
1895.....	21,529	1910.....	42,975
1896.....	17,068	1911.....	38,445
1897.....	26,042	1912.....	37,478

IMPORTS.

The imports of barytes for consumption during the last five years and the value of imported barium compounds, from 1908 to 1912, are given in the following two tables:

Barytes imported and entered for consumption in the United States, 1908-1912, in short tons.

YEAR	Manufactured		Unmanufactured	
	Quantity	Value	Quantity	Value
1908.....	3,401	\$29,168	13,661	\$58,822
1909.....	3,016	25,679	11,647	29,028
1910.....	3,565	29,782	21,270	48,457
1911.....	3,147	22,083	20,214	36,643
1912.....	3,679	26,848	26,186	52,467

BAUXITE

Production—The production of bauxite in the United States in 1911 amounted to 155,618 long tons, valued at \$750,649. Compared with the production in 1910 this represents an increase of 6,686 long tons or more than 4 per cent in quantity, and of \$34,391, or nearly 5 per cent in value.

The increases, though small, are normal, and indicate a healthy condition in the bauxite industries dependent on it.—*U. S. G. S.*, pp. 923.

The states producing bauxite in 1912 are as follows: Arkansas, Georgia, Alabama and Tennessee.

Uses—Bauxite is used as raw material in the production of metallic aluminum; in the manufacture of aluminum salts; in the manufacture of bauxite bricks; in the manufacture of alundum used as an abrasive. It is also used in the manufacture of calcium aluminate to give a quick set to plaster compositions.

There is only one bauxite mine in Tennessee, located on the east side of Missionary Ridge, near Chattanooga.

The following table shows the result of bauxite operations in Tennessee in 1912:

Average number of employees.....	60
Average wages paid per day.....	\$ 1 50
Total amount paid for labor.....	\$19,500
Total quantity of bauxite (long tons).....	8,806
Total value of product.....	\$35,224
Number of pits.....	2

Production of bauxite in the United States, 1889-1911, by States, in long tons.

YEAR	Georgia	Alabama	Arkansas	Total	Value
1889.....	728	-----	-----	728	\$ 2,366
1890.....	1,844	-----	-----	1,844	6,012
1891.....	3,301	292	-----	3,593	11,675
1892.....	5,110	5,408	-----	10,518	34,183
1893.....	2,415	6,764	-----	9,179	29,507
1894.....	2,050	9,016	-----	11,066	35,818
1895.....	3,756	13,313	-----	17,069	44,000
1896.....	7,313	11,051	-----	18,364	47,338
1897.....	7,507	13,083	-----	20,590	57,652
1898.....	-----	-----	-----	25,149	75,437
1899.....	15,736	14,499	5,045	35,280	125,598
1900.....	19,739	-----	3,455	23,194	89,676
1901.....	18,038	-----	867	18,905	79,914
1902.....	22,677	-----	4,645	27,322	120,366
1903.....	22,374	-----	25,713	48,087	171,306
1904.....	21,913	-----	25,748	47,661	235,704
1905.....	15,173	-----	32,956	48,129	240,292
1906.....	25,065	-----	50,267	75,332	368,311
1907.....	-----	-----	-----	297,776	480,330
1908.....	14,464	-----	237,703	52,167	263,968
1909.....	22,227	-----	2106,874	129,101	679,447
1910.....	33,096	-----	2115,836	148,932	716,258
1911.....	30,170	-----	2125,448	155,618	750,649

a Production of Tennessee included.

CEMENT

DEFINITION OF PORTLAND CEMENT.

Portland cement is the product obtained by calcining to clinker a finely ground artificial mixture of properly proportioned calcareous and argillaceous substances and finely grinding the resulting clinker.

Only such additions are permitted subsequent to the calcining as may be necessary to control certain properties, and such additions should not exceed 3 per cent by weight of the calcined product. The raw materials consist essentially of lime, silica, alumina and iron oxide in certain definite proportions, obtained by mixing limestone or marl with clay or shale, or by substituting low magnesia, blast furnace slag for clay or shale.

The clay, shale or slag furnish silica, alumina and iron oxide.

Impure limestone, called "cement rock," in which all the ingredients are present in nearly the proper proportion, is also used alone or is corrected by the addition of purer limestone.

The mixture of raw materials should contain about three parts of lime carbonate to one part of clayey materials.

The calcination or burning takes place at a high temperature, approaching 3,000 degrees F., and must therefore be carried on in kilns of special design and lining. During the burning chemical combination of the lime, silica, alumina and iron oxide takes place. The product of the burning is a semifused mass called "clinker", which consists of silicates, aluminates and ferrites of lime in certain fairly definite proportions. This clinker must be finely ground. A small and limited percentage of gypsum (hydrous calcium sulphate) is ground with the clinker. After such grinding the powder (Portland cement) will set under water.—*U. S. G. S.*, p. 499.

The chief ingredients used in this country are limestone and clay. The ratio, in the finished cement, of lime to silica alumina and iron oxide together, shall not be less than 2.3 to 1.

VALUATION OF RAW MATERIALS FOR THE MANUFACTURE OF PORTLAND CEMENT.

In determining the value of a deposit of raw material for Portland cement manufacture, a number of factors are to be considered:

1. The chemical composition of the material.
2. The physical character of the material.
3. The amount of material available.
4. Transportation facilities.
5. Location with respect to fuel supply.
6. Accessibility to the markets.

CHEMICAL COMPOSITION.

Portland cement consists approximately of three parts of lime (CaO_2), to one of silica (SiO_2), or 73.6 per cent of lime and 26.4 per cent of silica. However, alumina is always present in considerable quantity, taking the place of part of the lime.

The average composition, as shown by actual analyses, may be seen from the following selected from different brands of United States Portland cement manufacture:

CHEMICAL COMPOSITION OF AMERICAN CEMENTS.

	SiO ₂	Al ₂ O ₃ Fe ₂ O ₃	CaO	MgO	Alk.	SO ₂
Ala. P. C. Co. Red Diamond.....	19.56	12.16	62.27	0.64	-----	0.54
Pacif. P. C. Co. Golden Gate.....	22.57	10.64	62.61	1.27	-----	1.22
Mich. P. C. Co. Wolverine.....	21.02	7.51 3.83	63.95	1.05	0.98	1.50
Alpha P. C. Co. Alpha, N. J.....	22.89	8.00 2.44	63.38	2.30	-----	-----
Lehigh P. C. Co. Lehigh, Pa.....	22.13	9.56	62.63	2.51	-----	1.49
Alma P. C. Co. Alma, Ohio.....	21.63	6.70 4.75	63.58	1.10	-----	1.15
Average.....	21.63	10.76	63.07	1.47	-----	1.20

In general, the range of the three main ingredients is as follows:

Lime (CaO), 58 to 67 per cent; Silica (SiO₂), 19 to 25 per cent; Alumina (Al₂O₃), 5 to 10 per cent; Iron (Fe₂O₃), 1 to 5 per cent; Magnesia, usually from 1 to 4 per cent.

The materials for the manufacture of cement must be of the correct chemical composition. The various combinations that may be used are as follows:

1. Argillaceous hard limestone (cement rock) and pure limestone.
2. Pure hard limestone and clay or shale.
3. Soft (chalky) limestone and clay or shale.
4. Marl and clay or shale.
5. Alkali waste and clay.
6. Slag and pure limestone.

USES FOR CEMENT.

The construction of cement pavement is a phase of concrete work that is receiving increased attention at the present time, and a great deal of cement is being used for this purpose; and also in the construction of foundations and building blocks for concrete houses. The use on a large scale of concrete for heavy masonry, such as wharves, tunnels, viaducts, and retaining walls has become well established. It is also coming into pretty general use in architectural and art work. Large quantities of cement are used each year in the construction of Federal buildings.

TO INCREASE THE USE OF CEMENT.

The American Portland cement manufacturers, comprising most of the manufacturers as far west as Utah, with headquarters in Philadelphia, is doing much to increase the use of cement and to steady the industry, by means of engineering literature, illustrated lectures and monthly statistical reports of production, shipments, stock, etc. A second organization—the Western Association of Portland cement manufacturers, comprising companies of the Pacific coast, with headquarters at Portland, Ore.—has been established recently and it is expected that it will perform a similar service for the manufacturers in its territory.

On account of the growing scarcity of wood as a structural material the use of cement will continue to increase.

Tennessee affords many favorable localities for the erection of cement plants, and with the growing demand for the product our people should develop this important industry.

The following table shows the result of cement operations in Tennessee in 1912:

COUNTY	1912						1911		INCREASE + OR DECREASE -	
	EMPLOYEES			PRODUCT			PRODUCT		Quantity (Bbls.)	Value
	Average Number	Average Wages Paid per Day	Total Wages Paid	Quantity (Bbls.)	Value	Value per (Bbls.)	Quantity (Bbls.)	Value		
Marion.....	350			1,038,037	\$ 570,920	\$ 0.55	1,110,453	\$ 800,000	- 72,416	- \$229,080
Sullivan.....	135			381,900	250,000	0.65	109,000	70,000	+ 281,200	+ 180,000
Total.....	485	\$ 2.00	\$ 307,443	1,419,237	\$ 820,920	\$ 0.58	1,219,453	\$ 870,000	+ 208,784	- \$ 49,080

Production of Portland cement in the United States in 1911 and 1912, by States.

1911				1912		
STATE	Produc- ing Plants	Quantity (Bbls.)	Value	STATE	Produc- ing Plants	Quantity (Bbls.)
Pennsylvania.....	25	26,864,679	\$ 19,258,253	Pennsylvania.....	23	26,441,338
Indiana.....	5	7,407,830	5,937,241	Indiana.....	5	9,924,124
California.....	8	6,317,701	8,737,150	California.....	8	5,974,299
Kansas.....	12	4,871,903	3,725,108	New York.....	7	4,492,806
Illinois.....	5	4,582,341	3,583,301	Missouri.....	5	4,255,741
New Jersey.....	3	4,411,890	3,259,528	Illinois.....	5	4,209,357
Missouri.....	4	4,114,859	3,349,312	New Jersey.....	3	4,246,803
Michigan.....	11	3,686,761	3,024,676	Michigan.....	10	3,494,621
New York.....	7	3,314,217	2,669,194	Iowa.....	3	3,228,192
Iowa.....	3	1,962,590	1,881,253	Kansas.....	10	3,225,040
Ohio.....	5	1,451,852	1,228,690	Ohio.....	5	1,433,344
Washington.....	3	960,573	1,496,807	Washington.....	3	1,362,416
Utah.....	3	662,849	827,523	Utah.....	3	868,312
Texas.....	4	2,438,493	2,541,449	Texas.....	4	2,977,179
Oklahoma.....	2			Oklahoma.....	2	
Tennessee.....	2	1,981,341	1,590,438	Tennessee.....	2	2,348,886
West Virginia.....	1			West Virginia.....	1	
Kentucky.....	1			Kentucky.....	1	
Virginia.....	2	1,487,753	1,084,315	Virginia.....	1	1,737,739
Maryland.....	2			Maryland.....	2	
Colorado.....	2	1,162,081	1,272,317	Colorado.....	2	1,025,764
Montana.....	1			Montana.....	1	
Alabama.....	2	858,949	782,272	Alabama.....	2	992,135
Georgia.....	2			Georgia.....	1	
Total.....	115	78,528,637	\$ 66,248,817	Total.....	109	82,438,096

Average price per barrel of Portland cement, 1870-1912.

1870-1880.....	\$ 3.00	1893.....	\$ 1.91	1908.....	\$ 1.24
1881.....	2.50	1894.....	1.73	1904.....	.88
1882.....	2.01	1895.....	1.60	1905.....	.94
1883.....	2.15	1896.....	1.57	1906.....	1.13
1884.....	2.10	1897.....	1.61	1907.....	1.11
1885-1888.....	1.95	1898.....	1.62	1908.....	.85
1889.....	1.67	1899.....	1.43	1909.....	.813
1890.....	2.09	1900.....	1.09	1910.....	.891
1891.....	2.13	1901.....	.99	1911.....	.844
1892.....	2.11	1902.....	1.21	1912.....	.813

CLAY

Tennessee is exceptionally blessed with good deposits of clay, varying in its adaptability for manufactured products from common brick to porcelain and chinaware.

Practically in every county in the State fire and brick clays are found, though fire brick are manufactured now in only one or two localities, while common brick are made in all the towns of any importance.

Practically the entire surface of West Tennessee could be utilized in the making of common brick.

It is of special interest to know that West Tennessee furnishes probably the best ball clays obtained in the United States. A large and permanent market for these clays is found in the North, where the demand is larger than the output. Ball clays are used in the manufacture of various wares, the most important of which are china, porcelain, high voltage electric insulators, sanitary ware, vases and jardinières. However, none of these articles are made in Tennessee. We have been content to sell our clays in the North and buy these wares back from them, instead of receiving the profit in the manufacture of our own raw material.

Potter's Clay—Clays of this class must have good plasticity. This is necessary in order for the clay to be molded and to retain its shape until it is dried and burned. Potter's clay is used in the manufacture of jugs, jars, churns, crocks, flower pots, etc.

There are a number of plants operating successfully in Tennessee in the manufacture of these articles.

All of the potters' clay found in West Tennessee are along the western outcrop of the LaGrange formation and the western edge of the Ripley land. Pits are located near McKenzie, Hico, Toone, Pinson and Grand Junction in the LaGrange formation, and at Hollow Rock in the Ripley beds.

Fire Brick Clay—Fire brick are made from mixtures of plastic and non-plastic clays, which are very refractory, but occasionally a natural mixture will be found which gives the desired result. A fire brick clay must have the power to resist a high temperature, a high physical strength, a loose, porous texture to permit of rapid absorption and radiation of heat, and a small amount of shrinkage.

Common Brick Clay—These clays must have sufficient plasticity to be easily molded. They should burn to a dense, hard body at a low temperature; the chemical composition, except in a wide range, is not of very much importance, but physical properties will greatly help in determining the methods to be used in manufacturing brick.

Iron gives the red color to brick, while lime or magnesia gives cream or buff colors when present in considerable quantities.

Drainage Tile Clay—The clays used for drainage tile are similar to those used for common brick. Any clay that will burn to a porous body, that will dry without cracking, and that has a fair degree of strength, can be used for such a purpose.—*Wilbur A. Nelson, Assistant State Geologist, Tennessee.*

Ball Clay—A ball clay is a very plastic sedimentary clay, which burns white or cream, and is necessarily used on account of its bonding power in the making of white ware mixtures.

Cones—These are test pieces used for determining heat effects in kilns. They consist of a series of mixtures of clays with fluxes, so graded that they represent a series of fusion points, each but a few degrees higher than the one next to it. They are called Seger cones, because they were introduced by H. Seger, a German ceramist.

The temperature of the fusing point of the cones mentioned in this article are as follows:

Table of cone fusing point.

Cone	°Fahr,	°C.
4.....	2210	1210
6.....	2282	1250
8.....	2354	1290
27.....	3038	1670
30.....	3146	1730

Plasticity—Plasticity is the property that many bodies possess of changing their form under pressure, without rupturing. It is this property that permits clay to be molded into any shape.

Porosity—The porosity of a clay is the volume of the spaces between the clay particles. It is measured by the difference in weight in the burned ware, before and after being soaked in water.

Saggers—Saggers are oval or cylindrical receptacles having a flat bottom. They are made of fire-clay, and are used for protecting the ware in the kiln.

Shrinkage—The shrinkage in a clay is caused by the drawing closer together of the clay particles, through the evaporation of the moisture, and other volatile elements, such as combined water, organic matter and carbon. Shrinkage is of two kinds, air-shrinkage and fire-shrinkage. The latter occurs when a clay is burned.

Tensile strength—The tensile strength of a clay is the resistance which it offers to rupture or to being pulled apart when air dried.

Vitrification—The vitrification of a clay occurs when the grains of a clay become sufficiently softened by heat to close up all the pores and render the mass impervious.

Wad-clay—This is a low grade of fire-clay, which is used for grouting, or filling up the joints between the saggers, when they are set up in bungs in the kilns.

Wedging—This process consists in taking a large lump of tempered clay (clay thoroughly mixed with water and of uniform texture), cutting it in two, bringing the two parts together with force, and then kneading the reunited lumps, this treatment being repeated a number of times.

COMPARISON OF BALL-CLAY TESTS.

Plasticity—This is probably the most important property of a clay. A very important character, which appears to be closely dependent on plasticity, is the change to a hard condition when dry. The degree of hardness increases usually with the plasticity. In the ball-clays tested the eight samples from the Eocene formation have a plasticity ranging from 26.2 to 32.6 per cent, with an average of 29.2 per cent. This is practically the same as that of the standard English ball-clays, which is about 31 per cent.

The water of plasticity of the two Cretaceous clays was 27.4 and 31.9 per cent. One wad clay was tested which came from the Eocene formation. Its water of plasticity was 22.4 per cent, while on fire-clay tested had 19.4 per cent.

Tensile Strength—From tests made on eight different ball-clays, all from the Lagrange formation of Eocene age, the following interesting results were gotten:

A wide variation was shown to exist in the tensile strength of the ball-clays. These range from 51.2 pounds to the square inch as a lower limit, to 74.2 pounds per square inch as an upper limit, with an average of 62 pounds per square inch. Two ball-clays

were tested which occurred in the Ripley bed of Cretaceous age. They had a tensile strength of 115.6 and 112.2 pounds per square inch.

The average tensile strength of the ball-clays from Regina, Jefferson County, Missouri, is 99 pounds, with a maximum of 108 pounds; from Edgar, Florida, 65 pounds per square inch is the average; while at Woodbridge, N. J., the average tensile strength is 33 pounds per square inch.*

Good ball-clays should possess good tensile strength and plasticity. A high tensile strength enables a clay to carry large quantities of non-plastic materials, such as flint or feldspar.

Shrinkage—A knowledge of the air and fire shrinkage of a clay is vital to the manufacturer, for it is necessary to know this to produce ware of required dimensions. The maximum air shrinkage of Eocene ball-clays tested was 7.5 per cent, the minimum 6.1 per cent, with an average of 6.9 per cent. The air shrinkage of the two Cretaceous ball-clays was 7.4 and 9.0 per cent. The English ball-clays tested for comparison show a shrinkage of from $5\frac{1}{2}$ to 6 per cent.

The maximum fire shrinkage at cone 4 for the Eocene ball-clays was 11.4 per cent, the minimum 8.4 per cent, while the average was 9.8 per cent. This is slightly less than the results obtained from the English ball-clay, which was 12.3 per cent. The two Cretaceous clays gave a fire shrinkage of 5 and 12 per cent.

At cone 6 the average of the Eocene clays was 12.4 per cent, with a maximum of 5 per cent and a minimum of 11 per cent. At cone 8, the average for the same clays was 12.2 per cent, with a maximum of 15.3 per cent and a minimum of 9.6 per cent.

At cone 8 the English ball-clays tested varied from 12.5 to 13 per cent. These results show that in shrinkage the Tennessee ball-clays compare very closely with the standard English ball-clays.

Complete vitrification is at the point of maximum shrinkage. From this it can be seen that of the ten ball-clays tested, two from the Cretaceous and four from the Eocene, vitrify between cones 6 and 8, while two others appear to reach complete vitrification at cone 8. Thus only two of the samples need a higher heat than cone 8 for complete vitrification. From this it seems that the ball-clays of Tennessee differ from the other American ball-clays, as Ries says that "the ball-clays imported vitrify at cone 8, while the native ones require a much higher heat for vitrification."†

Porosity—The porosity of a clay is important, as it influences the clay's behavior towards the amount of water it will absorb, and the safe rate of drying, etc. A low porosity is desirable in most clay wares, as this increases its resistance to weathering agencies. The maximum porosity is found in a clay made up of entirely spherical grains of the same size. Such a clay is practically unknown. If in such a clay the particles are arranged as compactly as possible, one would find the porosity to be 25.95 per cent.‡

The average porosity of the Tennessee Eocene ball-clays at cone 4, is very high, being 20.6 per cent; the maximum is 26.2 per cent and the minimum is 16.1 per cent. The two Cretaceous clays have 23 and 27.7 per cent porosity. At cone 6 the porosity of the Eocene clays becomes much lower, the average being 11.6 per cent, the maximum 15.3 per cent and the minimum 6.4 per cent. The two Cretaceous clays show 11.8

*Clays, Occurrence, Properties and Uses, by Ries, and Prof. Paper No. 11, U. S. Geol. Surv., by Ries.

†Clays, Occurrence, Properties and Uses, by Ries, p. 204.

‡Theoretical Investigation of the Motion of Ground Waters, by C. S. Slichter, XIX Annual Report, U. S. Geol. Surv., Vol. 2, p. 310.

and 12 per cent porosity. At cone 6 the average porosity of the Eocene clays has slightly increased, being 13.4 per cent, maximum 16.7 per cent and minimum 6.5 per cent.

Porosity is least at the point of complete vitrification. This being the case the tests made show that all the Tennessee ball-clays vitrify at about cone 8, which is the point of vitrification of the standard English ball-clays.

The accompanying table shows at a glance how the different clays compare with each other and with the standard English ball-clays. The numbers in the first column refer to the number under which the sample is described in the report.

TESTS ON THE CLAYS OF HENRY COUNTY.

Table of tests, by F. A. Kirkpatrick.

No. of Test	Water of Plast. Dices and Bricks	Same T. S. Brick	Tensile Strength	SHRINKAGE				POROSITY			COLOR			Per Cent Variation T. S. Brick
				Drying	Cone 4	Cone 6	Cone 8	Cone 4	Cone 6	Cone 8	Cone 4	Cone 6	Cone 8	
1	27.4	25.5	115.6	7.4	5.0	7.0	5.6	23.0	11.8	14.5	83	60	80	11.2
2	25.5	24.5	115.6	5.3	5.0	9.5	7.5	22.5	7.4	10.3	83	60	75	10.5
3	19.4	19.4	66.7	4.5	2.3	5.5	4.3	27.4	17.1	18.2	83	75	75	9.6
4	27.4	27.5	63.1	6.1	10.2	12.4	14.2	16.1	8.8	11.7	89	83	83	18.3
5	26.5	26.6	51.8	7.5	9.6	13.3	12.0	20.6	15.3	16.7	95	86	86	13.1
6	27.2	26.3	71.3	6.1	10.0	11.4	12.3	22.3	15.3	16.7	95	83	86	10.7
7	31.9	32.6	112.2	9.0	12.0	15.8	15.1	27.7	12.0	21.3	83	60	83	10.5
8	26.2	26.2	67.3	6.6	9.4	11.4	11.4	20.1	14.1	15.0	95	83	86	10.6
9	28.2	28.0	61.4	7.2	8.9	12.0	10.6	26.2	15.0	16.3	95	86	86	11.6
10	22.4	23.1	129.8	4.7	3.3	6.6	4.5	28.0	22.1	24.5	83	83	83	7.2
11	32.6	30.4	51.2	7.0	10.3	13.2	12.7	19.0	6.6	6.5	87	83	85	24.1
12	31.3	27.1	74.2	7.4	8.4	11.0	9.6	23.0	13.5	16.0	92	83	86	14.2
13	34.6	31.9	55.8	7.3	11.4	15.0	15.3	17.6	6.4	8.3	89	83	83	15.0
20	31.1	Eng	ball	6.0	12.3	....	13.0	7.8	....	....	83	..	83	...
—	31.7	Eng	ball	5.3	12.4	....	12.7	....	....	....	83	..	83	....

Resume—These tests on the Tennessee ball-clays show that they are very similar to the standard English ball-clays and that they can be used in place of the English clays. There should be no difference in the results where the Tennessee clays are used.

The one wad-clay tested shows slight differences from the ball-clays. The tensile strength is higher, the shrinkage much less; and the porosity slightly higher. The water of plasticity is lower. This is what would be expected from a good wad-clay, which is expected not to "fly" or "stick."

(W. A. N.)

The above facts in reference to ball-clays are taken from "Tests On the Clays of Henry County," as published in "Resources of Tennessee," November, 1912.

Clay mined and sold in Tennessee in 1912 (short tons).

COUNTY	Total Number of Employees	CHARACTER OF CLAY MINED AND SOLD						Total
		Ball Clay	Fire-Clay	Kaolin	Sagger Clay	Slip-Clay	Stoneware Clay	
Fayette.....	1						50	50
Henry.....	166	30,792			4,577		17,127	52,496
James.....	3		365					365
Knox.....	3		397	390				787
Madison.....	35		308					308
Putnam.....	2						200	200
Rhea.....	4		1,348					1,348
Weakley.....	1		40					40
Total.....	215	30,792	2,458	390	4,577		250	55,594

RECAPITULATION.

Total number of employees.....	215
Average wages paid per day.....	\$ 1 46
Total amount paid for labor.....	\$ 77,028

Product and values.

CHARACTER OF CLAY	Product Short Tons	Value	Value Per Ton
Ball Clay.....	30,792	\$ 87,705	\$ 2.85
Fire Clay.....	2,458	4,477	1.82
Kaolin.....	390	498	1.25
Sagger Clay.....	4,577	7,899	1.72
Slip Clay.....			
Stoneware Clay.....	250	250	1.04
Wad Clay.....	17,127	22,243	1.30
Total.....	55,594	\$ 123,062	\$ 2.21

The clay given above is only such as is mined and sold as clay by the miner, and does not embrace the clay turned into brick, tiling, or pottery by the parties mining it, except as to stoneware values which are eliminated under head of brief statistics.

Of the above quantity 435 tons, valued at \$510, were sold to and used by Tennessee manufacturers.

The following table, taken from the U. S. Geological report, gives clay mined and sold in the United States in 1912 by states in short tons. Any discrepancies between this and previous State reports can be accounted for by different method of classifications.

Clay mined and sold in the United States in 1912, by states, in short tons.

STATE	Kaolin		Paper Clay		Slip Clay		Ball Clay		Fire Clay		Stoneware Clay		Brick Clay		Mineral's Clay (a)		Total	
	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value	Quan- tity	Value
Alabama.....									38,532 \$	31,414					4,500 \$	2,000	43,032	\$ 33,414
California.....	(b)	(b)							59,492	77,955	(b)	(b)			6,620	6,000	102,520	139,919
Colorado.....									22,167	37,813	(b)	(b)					72,435	72,106
Delaware.....	(b)	(b)							(b)	(b)					85	64	13,688	61,764
Florida.....																	(c)	(c)
Georgia.....			48,483	\$210,908	(b)	(b)			12,863	8,196			(b)	(b)	13,427	19,941	75,815	244,963
Idaho.....									(b)	(b)							(c)	(c)
Illinois.....									92,963	110,204	29,761	\$ 22,605	(b)	(b)	32,150	27,328	176,568	192,663
Indiana.....									49,916	46,171	(b)	(b)	4,192	1,866	31,700	24,720	82,085	71,391
Iowa.....															(b)	(b)	7,192	2,166
Kentucky.....					(b)	(b)			86,789	82,412					(b)	(b)	91,097	93,860
Maryland.....			(d)	(d)					21,264	32,437	(b)	(b)	370	498	d	2,765	25,279	36,687
Massachusetts.....									(b)	(b)			(b)	(b)			1,850	2,678
Michigan.....					2,024	\$ 6,164											2,043	6,173
Minnesota.....											(b)	(b)			(b)	(b)	(c)	(c)
Missouri.....	740	\$ 3,874			(b)	(b)			287,925	552,514	2,025	2,492	(b)	(b)	(b)	(b)	295,701	563,306
Montana.....									4,200	4,687					(b)	(b)	4,200	4,687
New Jersey.....									291,474	502,053	20,081	39,906	80,186	33,168	74,543	117,720	438,883	702,008
New Mexico.....									1,943	4,214							1,943	4,214
New York.....					(b)	(b)			(b)	(b)	88	74	(b)	(b)	1,867	4,924	7,845	18,718
North Carolina.....	14,960	139,717															15,068	139,821
North Dakota.....																	(c)	(c)
Ohio.....					2,880	3,640					62,881	39,998	32,489	17,855	33,568	8,902	350,448	262,755
Oregon.....									234,600	192,400	(b)	(b)					(c)	(c)
Pennsylvania.....			27,093	154,799					372,944	537,898	(b)	(b)	35,756	31,075	26,251	16,736	462,605	741,484
South Carolina.....			44,372	157,217					(b)	(b)			(b)	(b)			47,058	162,974
Tennessee.....									24,090	34,276	1,291	1,322			110	290	56,233	123,523
Texas.....									1,241	6,088					101	604	1,242	6,442
Utah.....									(b)	(b)							(c)	(c)
Vermont.....	(b)	(b)							(b)	(b)							(c)	(c)
Virginia.....									(b)	(b)					(b)	(b)	2,599	2,006
Washington.....									(b)	(b)							1,570	6,000
West Virginia.....					(b)	(b)			(b)	(b)							82,768	58,776
Wisconsin.....																	836	1,172
Wyoming.....																	(c)	(c)
Other States (e).....	10,162	77,166			11,425	17,769	31,496	130,688			95,945	108,006			36,399	32,164	f	61,512
Total.....	25,832	\$ 220,747	119,857	\$ 825,924	10,339	\$ 27,573	64,939	\$ 227,545	1,095,337	\$ 2,363,357	124,409	\$ 115,522	229,306	\$ 204,504	264,226	\$ 968,948	2,530,260	\$ 3,946,020

(a) Including bentonite, modeling clay, pipe clay, terra-cotta clay, and shale. (b) Included in "Other States." (c) Included in f (61,512 tons valued at \$192,701). (d) Paper clay for Maryland is included in "Maryland miscellaneous." (e) Includes all productions made by less than 8 producers in 1 State. (f) Made up of State totals of Florida, Idaho, Minnesota, North Dakota, Oregon, Utah, Vermont, and Wyoming.

CLAY PRODUCTS—BRICK, SEWER PIPE, TILING, ETC.

This table gives the number of employees engaged in clay products industries and the total value of the products in Tennessee for 1912.

Brick, tiling, sewer pipe and kindred products in Tennessee in 1912.

COUNTY	Total Number of Employees	Quantity (Thousands)					Total Value of Brick	Value of Drain Tile	Value of Sewer Pipe	Value of Hollow Building Tile, Blocks and Terra Cotta	Total Value of all Brick, Drain Tile, Etc.
		Common Brick	Vitrified Paving Brick	Front Brick	Fancy or Ornamental Brick	Fire Brick					
Blount.....	40	2,201					\$ 12,226				\$ 12,226
Carroll.....	22	1,500					7,500				7,500
Carters.....	25	300					1,800				1,800
Coffee.....	25	525			30		3,101				3,101
Davidson.....	258	32,251		8,467	10		254,072				254,072
Dyer.....	20	3,286					23,000				23,000
Gibson.....	39	3,400					21,300				21,300
Greene.....	37	830					5,440	\$ 6,285			11,725
Hamblen.....	21	700					4,850	100		\$ 1,500	6,450
Hamilton.....	410	30,390		35			155,240	10,000	\$ 150,000	15,000	330,240
Hawkins.....	8							1,064			1,064
Haywood.....	10	750					5,250				5,250
Henry.....	20	375					2,625				2,625
Knox.....	114	11,968		672		87	74,667				74,667
Lawrence.....	23	1,686					9,300				9,300
Madison.....	67	2,248				707	26,786				26,786
Marshall.....	15	400					2,400				2,400
Mauzy.....	27	1,006					5,039				5,039
Montgomery.....	25	1,500					10,457				10,457
Morgan.....	40			814			6,512				6,512
Obion.....	81	1,650					9,950	16,865			26,815
Putnam.....	7	80					720				720
Robertson.....	8	600					3,600				3,600
Rutherford.....	19	500					3,000	2,800			5,800
Scott.....	132		9,603				106,596				106,596
Shelby.....	125	24,421					180,068				180,068
Sullivan.....	101	14,955	35				89,018	315		134	89,467
Tipton.....	22	800					6,400				6,400
Weakley.....	25	2,000					13,000				13,000
White.....	10	500					4,000				4,000
Total.....	1,776	140,822	9,638	9,983	40	794					
Total Value.....		\$ 840,502	\$ 107,094	\$ 89,006	\$ 252	\$ 10,461	1,047,317	\$ 37,429	\$ 150,000	\$ 16,634	\$ 1,251,380
Value per 1,000.....		\$ 5.97	\$ 11.11	\$ 8.91	\$ 6.30	\$ 12.18					

RECAPITULATION.

Total average number of employees.....	1,776
Average wages paid per day.....	\$ 1 43
Total amount paid for labor.....	\$ 528,058

POTTERY

This table gives the average number of employes engaged in the pottery business in Tennessee in 1912, together with the value of all pottery products.

Employes and classified value of pottery products in Tennessee in 1912.

COUNTY	Total Average No. of Employes	Red Earth- ware	Stoneware	Turquoise Cups	Total Value	Total Kilns in Use
Carroll.....	3	\$ 100	\$ 2,076		\$ 2,176	
Davidson.....	35	1,790	24,002		25,792	
Hamilton.....	165			\$ 154,442	154,442	
Hardeman.....	6		5,000		5,000	
Madison.....	6	210	2,210		2,520	
Putnam.....	3		200		200	
Total.....	218	\$ 2,100	\$ 28,588	\$ 154,442	\$ 200,130	34

RECAPITULATION.

Total average number of employes.....	218
Average wages paid per day.....	\$ 1.44
Total amount paid for labor.....	\$ 74,733

COKE

While coal is mined in 16 counties in Tennessee, coke has been made in 11 counties as follows: Campbell, Claiborne, Cumberland, Grundy, Hamilton, Marion, Morgan, Rhea, Roane, Sequatchie and White.

Nearly all of the Tennessee coal possesses coking qualities. This varies, however, to a considerable extent, and is shown by the fact that but eight counties, namely: Campbell, Grundy, Hamilton, Marion, Morgan, Rhea, Roane and Sequatchie, are now producing coke, and four of these produce 77 per cent of the entire coke production.

The method of making coke in Tennessee is that of partial combustion in beehive-shaped ovens. Fixed carbon is the only constituent of the coal that is recovered in this style of oven. The entire coke output in Tennessee is manufactured in these beehive ovens. Modern retort ovens have been substituted in many parts of the United States for the old wasteful beehive type.

That Tennessee has never used the retort ovens is due to the fact that a large per cent of the coke is made at the mines from which the coal is taken, and is used by the blast furnaces at these points; that no effort is made to utilize the gas, one of the principal by-products, as there is little or no market for it; and that the plants necessary for the by-product ovens would require a large outlay in first cost.

Some of the by-products other than gas, obtained by the use of retort ovens, are: tar, ammonia in the form of sulphate, ammoniacal liquor, or anhydrous ammonia, and coke breeze.

The value of the recoverable contents of the coal used in making coke in the beehive ovens, which were wasted in 1912, in the United States, would, at the prices obtained, have been worth approximately \$80,000,000.

It is very probable that within a few years such plants will be erected in Tennessee, as the saving in the by-products recovered represent about 38 per cent of the value of the coke produced.

Most of the coke made in Tennessee is used in the blast furnaces. This requires a high-grade coke, low in ash, and hard in structure, so as to sustain the burden without crushing.

There are several seams in this State which make a high-grade blast furnace coke, comparing favorably with the Virginia coals.

In order to make the best coke, the coal should be crushed and washed. Washing greatly reduces the per cent of ash, which is especially necessary in blast furnace use.

The following table shows operators of coke plants, arranged alphabetically by counties; also name of coke works in Tennessee in 1912:

Coke manufacturers and coke works in Tennessee in 1912.

COKE MANUFACTURERS			COKE WORKS	
No.	County and Name	Post Office	County and Name	Post Office
1	CAMPBELL COUNTY LaFollette Iron Co.....	LaFollette.....	CAMPBELL COUNTY LaFollette.....	LaFollette
2	CLAIBORNE COUNTY Mingo Coal and Coke Co.....	Harttrant.....	CLAIBORNE COUNTY a Mingo.....	Harttrant
3	CUMBERLAND COUNTY Waldensia Coal and Coke Co.....	Waldensia.....	CUMBERLAND COUNTY a Waldensia.....	Waldensia
4	GRUNDY COUNTY Sewanee Fuel and Iron Co.....	Coalmont.....	GRUNDY COUNTY Coalmont.....	Coalmont
5	TENN. CONSOLIDATED COAL CO..... HAMILTON COUNTY	Tracy City.....	a Bryant Ridge..... HAMILTON COUNTY	Tracy City
6	Durham Coal and Iron Co..... MARION COUNTY	Chattanooga.....	Soddy..... MARION COUNTY	Soddy
7	New Etna Coal Co.....	Whiteside.....	a Etna.....	Whiteside
8	Tenn. Coal, I. & R.R. Co.....	Birmingham, Ala.....	a Victoria.....	Victoria
9	Tenn. Coal, I. & R.R. Co..... MORGAN COUNTY	Birmingham, Ala.....	Whitwell..... MORGAN COUNTY	Whitwell
10	State of Tennessee..... RHEA COUNTY	Nashville.....	Brushy Mountain..... RHEA COUNTY	Petros
11	Dayton Coal and Iron Co.....	Dayton.....	a Nelson.....	Dayton
12	Dayton Coal and Iron Co.....	Dayton.....	Richland.....	Dayton
13	Durham Coal and Iron Co..... ROANE COUNTY	Chattanooga.....	FOX..... ROANE COUNTY	Graysville
14	Roane Iron Co..... SEQUATCHIE COUNTY	Rockwood.....	Roane Iron..... SEQUATCHIE COUNTY	Rockwood
15	Chattanooga Iron and Coal Co..... WHITE COUNTY	Chattanooga.....	Dunlap..... WHITE COUNTY	Dunlap
16	Bon Air Coal and Iron Co.....	Nashville.....	a Eastland.....	Eastland

a—Not active.

COKE WORKS IN TENNESSEE.

The following table gives the number of coke ovens now built, the number in operation in 1912, and the value of coke works in Tennessee at the present time:

Coke ovens and coke works in Tennessee in 1912.

COUNTY	Number of Establishments	OVENS			VALUE OF WORKS		
		Built	Building	In Blast During Year	Plant	Machinery and Improvements	Total
Campbell.....	1	293	---	250	\$ 165,000	\$ 40,000	\$ 205,000
Claiborne.....	1	173	---	---	25,000	3,000	28,000
Cumberland.....	1	60	---	---	10,000	10,000	20,000
Grundy.....	2	410	---	60	68,000	9,100	77,100
Hamilton.....	1	208	---	208	53,900	60,000	113,900
Marion.....	3	445	---	100	46,500	3,956	50,456
Morgan.....	1	140	---	120	27,543	7,000	34,543
Rhea.....	3	449	---	205	80,875	22,000	102,875
Roane.....	1	275	---	225	40,000	5,000	45,000
Sequatchie.....	1	168	---	168	15,000	5,000	20,000
White.....	1	200	---	---	120,000	5,000	125,000
Total.....	16	2,821	---	1,386	\$ 651,818	\$ 170,056	\$ 821,874

NOTE—All ovens are of the beehive type.

EMPLOYEES AND WAGES PAID IN COKE WORKS.

The following table gives the number of employes, average and total wages paid, and amount of coal coked in Tennessee by coke works in 1912.

Employes and wages and character of coal coked in Tennessee in 1912.

COUNTY	EMPLOYEES			CHARACTER OF COAL COKED (Short Tons)				
	Total Number	Average Wages Paid Per Day	Total Amount Paid for Labor	Run of Mine		Slack		Total
				Unwashed	Washed	Unwashed	Washed	
Campbell.....	102			-			198,535	198,585
Claiborne.....								
Cumberland.....								
Grundy.....	20						33,723	33,723
Hamilton.....	65						124,688	124,688
Marion.....	22			14,839				14,839
Morgan.....	45						73,696	73,696
Rhea.....	66			71,839			41,925	113,764
Roane.....	100				157,774			157,774
Sequatchie.....	44				31,910			31,910
White.....								
Total.....	464	\$1.40	\$ 198,468	86,678	189,684		472,567	748,929

QUANTITY OF COAL COKED.

This table shows the quantity of coal consumed in the production of coke, the percentage yield of coal in coke, and the value of the coke produced by the coke works in Tennessee in 1912.

Coal coked, yield of coal in coke, and quantity and value of coke produced in Tennessee in 1912.

COUNTY	Coal Used (Short Tons)	Yield of Coal in Coke (Per Cent)	COKE PRODUCT		
			Quantity (Short Ton)	Value	Value Per Ton
Campbell.....	198,535	46.90	93,108	\$ 162,744	\$ 1.75
Claiborne.....					
Cumberland.....					
Grundy.....	33,723	57.40	19,358	48,395	2.50
Hamilton.....	124,688	44.70	55,738	133,771	2.40
Marion.....	14,839	61.04	9,058	22,645	2.50
Morgan.....	73,696	50.00	36,848	69,483	1.89
Rhea.....	113,764	52.35	59,560	172,908	2.90
Roane.....	157,774	50.00	78,887	247,382	3.14
Sequatchie.....	31,910	58.07	18,529	48,175	2.60
White.....					
Total.....	748,929	49.55	371,086	\$ 905,503	\$ 2.44

QUANTITY AND VALUE OF COAL COKED.

This table gives the quantity and value of coal used in the manufacture of coke, and the quantity and value of coal used per ton of coke in Tennessee for the year 1912.

Quantity and value of coal used, and quantity and value of coal per ton of coke in 1912.

COUNTY	Coal Used (Short Tons)	Total Value of Coal Used	Value of Coal per Ton	Quantity of Coal per Ton of Coke	Value of Coal in a Ton of Coke
Campbell.....	198,535	\$ 100,858	\$ 0.51	2.13	\$ 1.08
Claiborne.....					
Cumberland.....					
Grundy.....	33,723	30,351	.90	2.00	1.80
Hamilton.....	124,688	149,626	1.20	2.24	2.68
Marion.....	14,839	18,470	1.24	1.64	2.04
Morgan.....	73,696	44,218	0.60	2.00	1.20
Rhea.....	113,764	134,587	1.18	1.91	2.26
Roane.....	157,774	213,941	1.36	2.00	2.71
Sequatchie.....	31,910	35,101	1.10	1.72	1.89
White.....					
Total.....	748,929	\$ 727,152	\$ 0.97	2.02	\$ 1.96

QUANTITY AND VALUE OF COAL USED IN COKE MANUFACTURE.

Excluding the operations of the State at Brushy Mountain mines, in Morgan County, the quantity and value of coal used in coke manufacture are as follows:

Total coal used in coke manufacture (short tons).....	675,233
Total value of coal used in coke manufacture.....	\$ 682,934
Value per ton of coal used.....	1 01
Quantity of coal used per ton of coke product (short tons) ..	2 02
Total value of coal in a ton of coke.....	2 04

COST OF COKE PRODUCT.

Excluding the operations of the State at Brushy Mountain, which constitute the figures for Morgan County, the cost of coke product manufactured in 1912 is as follows:

	Total cost	Per cent of Total cost
Coal coked	\$ 682,934	72.60
Labor	198,468	21.10
All other expenses.....	59,271	6.30
Total cost of coke.....	\$ 940,673	100.00

ANALYSES.

The latest analyses given by the producing companies of coke manufactured in Tennessee are as follows:

Coke analyses in Tennessee in 1912.

COUNTY	ANALYSIS (Per Cent)					
	Name of Works	Fixed Carbon	Volatile Matter	Ash	Moisture	Sulphur
Campbell.....	LaFollette.....	79.84	6.15	14.01	-----	0.59
Grundy.....	Coalmont.....	85.78	0.39	13.44	0.39	0.61
Hamilton.....	Soddy.....	83.88	1.56	14.49	0.07	0.79
Marion.....	Whitwell.....	-----	-----	-----	-----	-----
Morgan.....	Brushy Mt.....	83.39	2.17	14.38	0.06	1.17
Rhea.....	Richland.....	80.00	1.00	18.00	-----	1.00
Rhea.....	Fox.....	80.20	1.59	18.14	0.07	0.70
Rhea.....	Rockwood.....	83.69	2.58	13.73	-----	0.56
Sequatchie.....	Dunlap.....	-----	-----	-----	-----	-----

The following table shows the production and other coke statistics in Tennessee for the years 1880, 1890, 1910, 1911, and 1912:

Consolidated statistics of coke manufacture in Tennessee, 1880-1912.

YEAR	Establishments	OVENS		Coal Used (Short Tons)	COKE PRODUCED			Yield of Coal in Coke (Per Cent.)
		Built	Building		Quantity (Short Tons)	Total Value of Coke at Ovens	Value per Ton	
1880.....	6	656	68	217,656	130,609	\$ 316,607	\$ 2.42	60.00
1890.....	11	1,664	292	600,387	348,728	684,116	1.96	53.00
1900.....	13	1,923	50	946,597	494,438	1,186,655	2.40	52.20
1910.....	16	2,715	-----	756,517	392,647	993,465	2.53	51.90
1911.....	16	2,884	30	670,967	333,274	801,945	2.41	49.67
1912.....	16	2,821	-----	748,929	371,086	905,503	2.44	49.55

This table shows the production and other coke statistics in the United States for the years 1880, 1890, 1900, and from 1901 to 1911, inclusive.

Consolidated statistics of coke manufacture in the United States, 1880-1911.

YEAR	Establishments	Ovens		Coal Used (Short Tons.)	Coke Produced			Yield of Coal in Coke (Per Cent)
		Built	Building		Quantity (Short Tons)	Total Value of Coke at Ovens	Value per Ton	
1880.....	186	12,372	1,159	5,237,741	3,333,300	\$ 6,631,367	\$ 1.99	63.00
1890.....	253	37,158	1,547	18,005,309	11,608,021	23,215,302	2.02	64.00
1900.....	396	58,484	5,804	32,113,553	20,533,348	47,443,331	2.31	63.90
1901.....	423	63,951	5,205	34,207,965	21,795,883	44,445,923	2.04	63.70
1902.....	456	69,060	8,758	39,604,007	25,401,730	63,339,167	2.49	64.10
1903.....	500	79,334	6,175	39,423,525	25,274,281	66,498,664	2.63	64.10
1904.....	507	83,599	4,430	36,531,608	23,661,106	46,144,941	1.95	64.30
1905.....	519	87,564	4,761	49,530,677	32,231,129	73,476,196	2.25	65.10
1906.....	532	93,901	4,519	55,746,374	36,401,217	91,608,034	2.52	65.20
1907.....	552	99,680	2,546	61,946,109	40,779,564	111,539,126	2.74	65.80
1908.....	551	101,218	2,241	39,440,837	26,033,518	62,483,983	2.40	66.00
1909.....	579	103,982	2,950	59,354,937	39,315,065	89,965,483	2.30	66.20
1910.....	578	104,440	2,567	63,088,327	41,708,810	99,742,701	2.39	66.11
1911.....	570	103,879	2,254	53,278,248	35,551,489	84,130,849	2.37	66.71

The following tables, taken from the U. S. Geological Report, give the number of coke ovens and the quantity of coke produced in the United States for different periods:

Number of coke ovens in each state at close of each year, 1907-1911.

STATE OR TERRITORY	1907	1908	1909	1910	1911
Alabama.....	9,889	10,103	10,061	10,132	10,121
Colorado.....	3,799	3,841	3,846	3,611	3,606
Georgia.....	350	350	350	350	225
Illinois.....	309	430	468	508	506
Indiana.....	28	46	96	90	586
Kansas.....	83	67	67	71	53
Kentucky.....	495	495	494	495	577
Maryland.....	200	200	200	200	200
Massachusetts.....	400	400	400	400	400
Michigan.....	150	150	162	162	162
Minnesota.....	50	50	50	50	50
Missouri.....	5	4	4	4	-----
Montana.....	567	551	551	451	451
New Jersey.....	150	150	150	150	150
New Mexico.....	896	1,016	1,030	1,030	1,030
New York.....	540	540	556	556	556
Ohio.....	600	481	447	498	496
Oklahoma (Indian Territory).....	490	496	536	408	410
Pennsylvania.....	51,364	52,606	54,506	55,656	54,904
Tennessee.....	2,806	2,792	2,729	2,792	2,547
Utah.....	884	864	854	854	854
Virginia.....	5,333	4,853	5,499	5,389	5,496
Washington.....	216	231	235	235	235
West Virginia.....	19,658	20,124	20,283	19,912	19,876
Wisconsin.....	385	388	388	388	388
Total.....	99,680	101,218	103,982	104,440	103,879

*Quantity of coke produced in the United States, 1907-1911, by states, in short tons,
with increase and decrease in 1911.*

STATE	1907	1908	1909	1910	1911	Increase (+) or Decrease (-) in Quantity of Coke Produced	
						1910-11	Per cent
Alabama.....	3,021,794	2,362,666	3,085,821	3,249,027	2,761,521	- 487,506	-15.0
Colorado (a).....	1,421,579	982,291	1,251,805	1,346,211	1,177,023	- 169,188	-12.6
Georgia.....	74,934	39,422	46,385	43,814	37,553	- 6,261	-14.2
Illinois.....	372,697	362,182	1,276,956	(b)	(b)	(b)	(b)
Kansas.....	6,274	2,497	(b)	(b)	(b)	(b)	(b)
Kentucky.....	(b)	(b)	46,371	53,857	66,099	+ 12,242	+22.7
Montana.....	(b)	(b)	(b)	(b)	(b)	(b)	(b)
New Mexico.....	265,125	274,565	373,967	401,646	381,927	- 19,719	- 4.9
New York.....	(b)	(b)	(b)	652,459	686,172	+ 33,713	+ 5.2
Ohio.....	270,634	159,578	222,711	282,315	311,382	+ 29,067	+10.3
Oklahoma (Indian Territory).....	(b)	(b)	(b)	(b)	(b)	(b)	(b)
Pennsylvania.....	26,513,214	15,511,634	24,905,525	26,315,807	21,923,935	- 4,391,872	-16.7
Tennessee.....	467,499	214,528	261,808	322,756	330,418	+ 7,662	+ 2.4
Utah.....	(c)	(c)	(c)	(c)	(c)	(c)	(c)
Virginia.....	1,545,280	1,162,051	1,347,478	1,493,655	910,411	- 583,244	-39.5
Washington.....	52,028	33,889	42,981	59,337	40,180	- 19,157	-32.3
West Virginia.....	4,112,866	2,687,123	3,943,948	3,803,850	2,291,049	- 1,512,801	-39.8
Other States.....	2,655,610	2,286,092	2,509,306	3,684,276	4,633,519	+ 949,543	+25.8
Total.....	40,779,564	26,033,518	39,315,065	41,708,810	35,551,489	- 6,157,321	-14.8

a Colorado includes Utah.

b Included with other states having less than three producers.

c Included with Colorado.

COPPER, GOLD AND SILVER

The entire output of copper is mined in what is known as the Ducktown district, located in the extreme southeastern part of the State, in Polk County. The companies operating in this district are the Tennessee Copper Company, Copper Hill, Tenn., and the Ducktown Sulphur, Copper & Iron Co., Isabella, Tenn., with its home office in London, England.

"The district was one of the earliest large producers in the country. Operations began about 1850, and from that date till the close of the Civil War there was a large production from the 'black copper ores.' With the exhaustion of the rich secondary deposits attempts were made to work the lean original sulphides. These efforts met with only indifferent success, and in the late seventies the smelters shut down, thus ending the first period of activity in this district.

"The present period of activity began in 1890, when the Ducktown Sulphur, Copper & Iron Co. began operations. Since that time the district has been a steady producer from the primary sulphide ores. To the close of 1912 the total output of the district has been approximately 249,055,000 pounds.

"The ores occur as steeply dipping lenses replacing calcareous bands in schist, the ore bodies in general conforming to the dip and strike of the schistosity of the enclosing rock.

"The principal sulphide is pyrrhotite, with subordinate pyrite, chalcopyrite and spalerite. Extensive gossars capped the ore bodies, and it was the enriched zones underlying these that furnished the rich chalcocite ores that were extracted during the first period of activity. In 1912 the ores in the district yielded 30.6 pounds of blister copper per ton, or 1.53 per cent, with an average value of 7 cents in gold and silver per ton of ore.

"A part of the copper is marketed without electrolytic refining. The fact that the ores can be extracted with little timbering, the cheap supply of coke and coal from Tennessee and West Virginia, and the comparative low cost of labor, have made it possible to mine and treat these low-grade ores at a profit.

"The pyritic process of smelting is practiced successfully by both companies. The low-grade matte produced by the first smelting is resmelted and brought to a proper grade for conversion.

"Sulphuric acid plants were operated by both the Ducktown Sulphur, Copper & Iron Co., and the Tennessee Copper Co. The successful operation of these plants has apparently not only solved the troublesome smoke problem, but added very materially to the revenue of the companies. The sulphuric acid production will probably be fully as important in the future as the copper output." (U. S. Geol. Surv.)

The Tennessee Copper Co. is operating three mines, the Burra Burra, the London and the Polk County. The Ducktown Sulphur, Copper & Iron Co. operates two—the Mary and the East Tennessee mines.

These mines are developed by shafts, either vertical or slightly inclined, and the ore is mined by both the overhead or shrinkage system on timbers and the underhand staking system.

GOLD AND SILVER.

There were no gold or silver mines productive in Tennessee in 1912, the entire output being obtained from the reduction of copper in the Ducktown district. Gold, however, is found in the Coker Creek district in Monroe County, and in the early days

there was considerable gold taken from this district by the crude methods of placer mining. There are no operations in this locality at present.

SULPHURIC ACID.

Sulphuric acid enters as an important factor in the manufacture of fertilizer; the refining of petroleum products; the iron, steel and coke industries; the manufacture of nitro-cellulose, nitro-glycerine, celluloid, etc.; and in general metallurgical and chemical practice. This industry is very important to the South, as sulphuric acid is vitally connected with the manufacture of fertilizers. The cost of fertilizer is materially affected by the cost of sulphuric acid. The manufacture of fertilizer apart from sulphuric acid is very simple and the cost is comparatively small.

A large sulphuric acid plant was put into operation in the Ducktown district in 1908, to which an extensive addition was made in 1910. The operation of these plants puts to profitable use what has been heretofore a waste product of the smelters and relieves the surrounding country of the deleterious effect of the smelter fumes on vegetation, so that the surrounding country can now be cultivated.

That they render valuable this former worthless waste has more than doubled the net profit per ton of ore.

COPPER.

Total average number of employes.....	707
Average wages paid per day.....	\$ 2.17
Total amount paid for labor.....	\$ 450,603
Crude ore product (short tons).....	603,070
Value of product (crude ore).....	\$ 996,368
Value per ton (crude ore).....	\$ 1.65
Crude ore treated (short tons).....	603,229
Refined copper produced (pounds).....	18,138,173
Value of product (refined copper).....	\$2,846,550
Average value per pound refined copper (cents).....	15.694
Yield per ton of crude ore in metal (pounds).....	30.07
Yield of crude ore in refined copper (per cent).....	1.50
Stock on hand beginning of year (pounds).....	1,605,654
Stock on hand at end of year (pounds).....	73,244
Sales, quantity of (pounds).....	19,714,984
Sales, amount of.....	\$3,023,290

GOLD.

Total product in fine ounces.....	400
Total value	\$ 7,996

SILVER.

Total product in fine ounces.....	89,893
Total value	\$ 54,905

SULPHURIC ACID.

Total product (short tons).....	291,251
Total value	\$1,513,651

The following table gives copper, gold and silver product in 1912, compared with 1911:

Production of copper, gold and silver in 1912, compared with 1911.

YEAR	Copper Ore Treated	METAL CONTENT					
		Refined Copper		Gold		Silver	
		Quantity (Short Tons)	Value	Quantity (Fine Ounces)	Value	Quantity (Fine Ounces)	Value
1911.....	578,174	18,732,884	\$ 2,181,662	567	\$ 11,339	106,660	\$ 57,158
1912.....	603,339	18,138,173	2,846,580	400	7,906	89,893	54,905
Increase (+) or Decrease —	+ 25,055	— 594,711	+ \$ 664,888	— 167	— \$ 3,343	— 16,767	— \$ 2,253

The following table shows copper operations in Tennessee from 1898, the first year of activity, to 1912, inclusive:

Copper statistics in Tennessee from 1898 to 1912, inclusive.

YEAR	PRODUCT AND VALUE			Crude Ore Treated (Short Tons)	REFINED COPPER AND VALUE			Yield of Crude Ore in Refined Copper (per Cent)	Yield in Pounds of Metal for Each Ton of Crude Ore
	Quantity (Short Tons)	Value Crude Ore	Value per Ton		Quantity (Pounds)	Value	Value per Pound (Cents)		
1898.....	95,568	\$ 205,471	\$ 2.15	80,083	3,240,740	\$ 356,481	.11	2.01	34.
1899.....	112,118	285,900	2.55	82,184	3,357,141	559,635	.1667	2.04	30.
1900.....	118,942	303,302	2.55	97,564	3,454,132	559,223	.1616	1.77	29.04
1901.....	267,830	669,575	2.50	162,461	5,732,048	908,914	.15857	1.71	21.40
1902.....	333,239	716,463	2.15	335,864	12,284,515	1,367,421	.11131	1.82	36.86
1903.....	319,873	719,714	2.25	370,278	13,668,389	1,809,011	.13235	1.84	42.76
1904.....	287,830	641,860	2.23	384,886	13,905,018	1,721,549	.1239	1.81	48.31
1905.....	384,192	864,432	2.25	399,330	14,541,425	2,219,938	.1526	1.87	37.85
1906.....	539,381	1,321,483	2.45	538,141	17,354,781	3,211,966	.185	1.61	32.20
1907.....	548,171	1,370,200	2.50	557,950	18,892,309	3,652,720	.193	1.72	33.86
1908.....	643,256	1,362,702	2.12	618,806	19,459,501	2,552,130	.131	1.57	31.45
1909.....	580,000	713,675	1.23	577,670	19,083,099	2,389,964	.12982	1.65	33.03
1910.....	534,610	628,538	1.18	552,806	16,837,727	2,081,500	.12738	1.52	30.46
1911.....	586,514	736,329	1.26	578,174	18,732,884	2,181,662	.11646	1.62	32.40
1912.....	603,070	996,368	1.65	603,229	18,138,173	2,846,560	.15694	1.50	30.07

GAS, GAS COKE, TAR AND AMMONIA

This table shows number of employees, coal carbonized, total quantity of gas produced in Tennessee in 1912 by counties, and quantity and percentage of gas sold and gas lost or unaccounted for:

Coal carbonized, gas produced, gas sold and gas lost or unaccounted for in 1912.

COUNTY	Total Number of Employees	Coal Carbonized (Short Tons)	Total Gas Production (Cu. Ft.)	Gas Sold		Gas Lost or Unaccounted For	
				Quantity (Cubic Feet)	Percentage	Quantity (Cubic Feet)	Percentage
Davidson.....	150	b33,706	317,583,200	254,714,200	80.20	62,869,000	19.80
Hamilton.....	49	16,464	176,872,600	157,014,700	88.77	19,857,900	11.23
Knox.....	80	b15,864	153,042,000	132,196,960	86.38	20,845,040	13.62
Madison.....	30	b3,604	38,741,110	33,484,000	86.43	7,255,110	13.57
Montgomery.....	4	428	8,929,200	6,965,000	78.00	1,964,200	22.00
Rutherford.....	2	402	1,455,000	1,455,000	100.00	-----	-----
Shelby.....	30	(a)	420,000,000	361,200,000	86.00	58,800,000	14.00
Sullivan.....	19	b1,855	17,909,800	9,893,000	55.55	7,916,800	44.45
Total.....	364	72,823	1,124,432,710	956,922,860	84.35	177,509,850	15.65

a Oil and water gas exclusively. *b* Oil used also.

ILLUMINATING AND FUEL GAS.

This table gives the quantity and value of gas sold in Tennessee for fuel and illuminating purposes and the price paid therefor.

Gas produced and sold for illuminating and fuel purposes in Tennessee in 1912.

COUNTY	Gas Sold for Illuminating Purposes			Gas Sold for Fuel Purposes			Total Gas Sold		
	Quantity Cubic Feet	Value	Pr per 1,000 Cubic Feet	Quantity Cubic Feet	Value	Pr per 1,000 Cubic Feet	Quantity Cubic Feet	Value	Pr per 1,000 Cubic Feet
Davidson.....	145,221,800	\$ 145,322	\$ 1.00	109,392,400	\$ 109,392	\$ 1.00	224,714,200	\$ 254,714	\$ 1.00
Hamilton.....	94,014,700	92,064	0.98	63,000,000	61,692	0.98	157,014,700	153,756	0.98
Knox.....	52,095,550	52,096	1.00	80,101,410	80,101	1.00	132,196,960	132,197	1.00
Madison.....	12,826,000	17,315	1.35	20,658,000	27,889	1.35	33,484,000	45,204	1.35
Montgomery.....	4,579,000	6,889	1.50	2,386,000	3,340	1.40	6,965,000	10,209	1.47
Rutherford.....	582,000	873	1.50	873,000	1,091	1.25	1,455,000	1,964	1.35
Shelby.....	67,183,200	67,183	1.00	294,016,800	294,017	1.00	361,200,000	361,200	1.00
Sullivan.....	1,236,300	1,385	1.10	8,656,700	9,526	1.10	9,893,000	10,911	1.10
Total.....	377,838,550	\$383,107	\$ 1.01	579,084,310	\$ 587,048	\$ 1.01	956,922,860	\$ 970,155	\$ 1.01

RECAPITULATION.

Total average number of employees.....	364
Average wages paid per day.....	\$ 2 10
Total amount paid for labor.....	\$ 273,126
Total population of all gas districts.....	395,070
Number of miles of mains.....	482
Number of gas meters in use.....	38,779
Number of gas stoves in use.....	30,345
Oil used (gallons).....	2,040,451

CLASSIFIED PRODUCT AND VALUE.

Classified product and value of gas and by-products in 1912.

Kind of product	Quantity	Value
By-products:		
Ammonia liquor (1,222,810 gallons) equivalent to anhydrous ammonia NH_3 (lbs) ..	475,801	\$ 58,223
Coke (short tons).....	46,041	120,849
Tar (gallons)	1,057,015	34,349
Total by-products		\$ 213,421
Gas sold (cubic feet).....	955,922,860	970,155
Grand total value.....		\$1,183,576

IRON ORE

Among the most noteworthy features of the iron mining and manufacturing industries in the United States in 1912 was the large increase in the production of iron ore, pig iron, and steel, compared with the output of 1911, and the generally rapid recovery from the industrial stagnation of 1911. The quantity of iron ore mined in 1912 did not quite equal that of the record year, 1910, but the tonnages of pig iron and steel manufactured in 1912 both ran ahead of the output of those metals in 1910.

(U. S. G. S.)

Iron ore is found in three distinct belts in Tennessee, known as the Eastern, Middle and Western iron regions.

The Eastern Region includes the counties of Blount, Carter, Cocke, Greene, Hancock, Johnson, McMinn, Monroe, Polk, Sevier, Sullivan, Unicoi and Washington.

The Middle Region includes the counties of Anderson, Bledsoe, Campbell, Claiborne, Hamilton, James, Marion, Meigs, Rhea, Roane, Sequatchie and Union.

The Western Region includes the counties of Benton, Davidson, Decatur, Dickson, Hardin, Hickman, Humphreys, Lawrence, Lewis, Montgomery, Perry, Stewart, Sumner and Wayne.

The "Rockwood" ore in East Tennessee outcrops along the foot of the Cumberland escarpment from the southern border of the State below Chattanooga to the northern border of the State at Cumberland Gap and in several separate areas in the Tennessee Valley. The Cumberland outcrop is not continuous, because in a number of thrust faults the formation has been buried below older rocks. There are, however, strips of outcrop that extend distances of 15 to 20 miles continuously. The normal dip of the rocks along the escarpment is toward the northwest, but in many places the ore beds outcrop to the southeast or away from the mountain. This reversed dip is due to the strata having been overturned during the folding of the earth's crust, and it extends from a few feet to hundreds of feet below the surface. The iron ore-beds extend under the Cumberland Plateau for unknown distances. In the northeast part of the State it is very probable that the bed is continuous between Powell Valley and Elk Valley, the outcrop in Elk Valley being due to faulting and erosion. Near Caryville the southwestward extension of the ore is cut off by a cross-fault, which extends northwest as far as Elk Valley and here also cuts off the ore that is exposed in that valley, thus forming a block of strata bounded on the southeast by Powell Valley, on the southwest by Coal Creek, on the northwest by Elk Creek, and on the northeast by a fault which passes through Cumberland Gap. Along the escarpment between Coal Creek and Harriman, the ore is cut out locally by several thrust faults, so that only three limited areas of outcrop are found. From Emory Gap southwest to near Glen Alice, the ore outcrop is more or less continuous, and in this area from Cardiff to Rockwood occurs one of the thickest and most valuable lenses of ore that has been opened anywhere in the State. Between Glen Alice and Spring City there is one important break due to faulting, but southwest from Spring City to Retro the ore outcrop is practically continuous. Between Retro and Rathburn there is a break followed by a strip of ore outcrop measuring about 2½ miles in length, beyond which no ore is found until the valley of Falling Waters Creek is reached. From Falling Waters Creek southwestward to the State line the ore outcrop is practically continuous, and it is duplicated on both sides of a narrow anticlinal arch. This arched structure also occurs from Hill City southward to the State line in a second outcrop which lies 1 to 2 miles east of the main outcrop at the foot of the Cumberland escarpment and passes through the city of Chattanooga.

In the Tennessee Valley the several areas of "Rockwood" ore are formed by beds that have been folded in among strata of earlier age. The most important of these

are situated near Chamberlain, a few miles south of Tennessee River in Roane County, and along Tennessee River near Euchee, Meigs County. These outcrops are mostly in the form of synclinal basins of "Rockwood" formation modified by more or less folding and faulting. Just northeast of Decatur a small area occurs which is bounded on the east by a fault, and farther south, Whiteoak Mountain forms the west limb of a syncline in which ore occurs extending from the State line northward several miles from Ooltewah. Soft ore has been stripped from the outcrop along nearly the whole extent of outcrop in the State, the only exceptions being in localities too remote from railroads or navigable streams. The ore has been mined underground at Lafollette, to a very small extent near Elk Valley, extensively between Emory Gap and Rockwood; and a few small drifts or tunnels have been driven near Glen Alice. Considerable underground work has been done in the vicinity of Chamberlain and Euchee, and a little near Ooltewah. The possibility of underground mining has, of course, depended on the thickness of the ore bed and upon the quality of the hard ore below the limit of weathering, as well as on transportation lines.

If placed end to end the outcrops of "Rockwood" ore along the base of Cumberland escarpment, considered as but one ore seam, would aggregate 160 linear miles. If the valley outcrops be similarly considered it brings the total linear outcrop of "Rockwood" ore beds in Tennessee up to 245 miles. Out of this total probably 60 miles of outcrop may be considered as workable for hard ore, so far as quality and thickness are concerned, to whatever distances below the outcrop may be permitted by mining conditions. The ore beds range in thickness from an inch to 7 or 8 feet, but are not generally more than 3½ feet thick. Two feet is considered to be about the minimum workable thickness underground, unless the ore is of extraordinary quality. On the outcrop, where the bed may be stripped and mined from an open cut a much smaller thickness of ore may be profitably mined.

(U. S. G. S.)

IRON ORE.

This table gives the average number of employees, the character and value of the product, and the explosives in use in iron ore mined in Tennessee for 1912.

Iron ore operations in Tennessee in 1912.

COUNTY	Total Average Number of Employees	Character of Product (Long Tons)			Value of Product		Explosives Used	
		Brown Hematite	Red Hematite	Total	Total Value	Value per Ton	Dynamite (Pounds)	Powder (Keas)
	1	5	6	7	9	10	11	12
Campbell.....	62		12,347	12,347	\$ 18,520	\$ 1.50		
Hickman.....	149	42,171		42,171	72,566	1.72	1,000	775
Lawrence.....	193	55,124		55,124	73,629	1.34	1,220	480
Lewis.....	118	13,953		13,953	21,108	1.51		102
Meigs.....	60		32,634	32,634	51,209	1.57	14,800	
Monroe.....	40	7,911		7,911	12,262	1.55		
Roane.....	451		192,863	192,863	235,299	1.23	27,000	6,600
Stewart.....	40	11,419		11,419	10,277	.90	800	25
Wayne.....	80	47,475		47,475	73,067	1.54	5,250	1,996
Total.....	1,193	178,053	237,844	415,897	\$567,937	\$ 1.37	49,870	9,958

RECAPITULATION.

Total average number of employees.....	1,193
Average wages paid per day.....	\$ 1 56
Total amount paid for labor.....	\$ 406,146

PRODUCT AND VALUE OF IRON ORE.

This table gives the product and the value of iron ore produced in Tennessee for 1912, compared with that of 1911, and shows the increases and decreases.

Product and value of iron ore in Tennessee in 1912, compared with 1911.

COUNTY	1912		1911		Increase + or Decrease	
	Product (Long Tons)	Value	Product (Long Tons)	Value	Product (Long Tons)	Value
Campbell.....	12,347	\$ 18,520	14,325	\$ 20,217	1,978	\$ 1,697
Hickman.....	42,171	72,566	66,003	95,399	23,832	22,823
Lawrence.....	55,124	73,629	78,217	117,266	23,093	43,637
Lewis.....	13,953	21,108	3,175	4,604	10,778	16,504
Meigs.....	22,634	51,200	22,684	40,565	9,950	10,644
Monroe.....	7,911	12,262			7,911	12,262
Roane.....	192,863	235,290	211,702	247,326	18,839	11,937
Stewart.....	11,419	10,277	11,965	10,769	546	492
Wayne.....	47,475	73,067	59,285	88,927	11,810	15,860
Total.....	415,897	\$ 567,937	467,356	\$ 624,963	51,459	\$ 57,026

Product and value of iron ore in Tennessee, 1892 to 1912, inclusive.

YEAR	Product (Long Tons)	Value	Value per Ton	YEAR	Product (Long Tons)	Value	Value per Ton
1892.....	406,578			1903.....	724,264	\$ 878,909	\$ 1.21
1893.....	372,996			1904.....	539,830	612,705	1.14
1894.....	292,831			1905.....	730,961	962,427	1.32
1895.....	519,796			1906.....	897,059	1,252,853	1.42
1896.....	535,494			1907.....	817,767	1,306,727	1.60
1897.....	604,497			1908.....	588,988	803,676	1.37
1898.....	617,579			1909.....	648,825	935,963	1.44
1899.....	667,149			1910.....	674,693	988,281	1.46
1900.....	699,724			1911.....	467,356	624,963	1.34
1901.....	620,458			1912.....	415,897	567,937	1.37
1902.....	628,870	\$754,644	\$ 1.20				

IRON (PIG).

The following table gives names and postoffice address of all pig iron manufacturers and proprietors of furnaces in Tennessee for the year 1912:

Pig iron manufacturers and furnaces in Tennessee in 1912.

MANUFACTURERS			FURNACE		
No.	COUNTY AND NAME	POST OFFICE	No.	COUNTY AND NAME	LOCATION
	CAMPBELL COUNTY			CAMPBELL COUNTY	
1	LaFollette Iron Co.-----	LaFollette-----	1	LaFollette-----	LaFollette
	DICKSON COUNTY			DICKSON COUNTY	
2	Warner Iron Co.-----	Cumberland Furnace	2	Cumberland-----	Cumb. Furnace
	HAMILTON COUNTY			HAMILTON COUNTY	
3	Citico Furnace Co.-----	Chattanooga-----	3	a Citico-----	Chattanooga
4	Chattanooga Iron and Coal Co.-----	Chattanooga-----	4	Chattanooga-----	Chattanooga
	HICKMAN COUNTY			HICKMAN COUNTY	
5	Bon Air Coal and Iron Co.-----	Nashville-----	5	a Warner-----	Warner
6	Napier Iron Works-----	Nashville-----	6	a Aetna-----	Aetna
7	Standard Iron Co.-----	Nashville-----	7	Goodrich-----	Goodrich
	LEWIS COUNTY			LEWIS COUNTY	
8	Napier Iron Works-----	Nashville-----	8	Napier-----	Napier
	MARION COUNTY			MARION COUNTY	
9	Tennessee Coal, Iron and R.R. Co.-----	Birmingham, Ala.-----	9	a South Pittsburg 1.-----	South Pittsburg
	Tennessee Coal, Iron and R.R. Co.-----	Birmingham, Ala.-----	10	a South Pittsburg 2.-----	South Pittsburg
	Tennessee Coal, Iron and R.R. Co.-----	Birmingham, Ala.-----	11	a South Pittsburg 3.-----	South Pittsburg
	MAURY COUNTY			MAURY COUNTY	
10	J. J. Gray, Jr.-----	Rockdale-----	12	Rockdale-----	Rockdale
	MONTGOMERY COUNTY			MONTGOMERY COUNTY	
11	Red River Furnace Co.-----	Clarks ville-----	13	a Helen-----	Clarks ville
	RHEA COUNTY			RHEA COUNTY	
12	Dayton Coal and Iron Co.-----	Dayton-----	14	Dayton 1.-----	Dayton
	Dayton Coal and Iron Co.-----	Dayton-----	15	Dayton 2.-----	Dayton
	ROANE COUNTY			ROANE COUNTY	
13	Roane Iron Co.-----	Rockwood-----	16	Rockwood 1.-----	Rockwood
	Roane Iron Co.-----	Rockwood-----	17	Rockwood 2.-----	Rockwood
	Roane Iron Co.-----	Rockwood-----	18	Rockwood 3.-----	Rockwood
	STEWART COUNTY			STEWART COUNTY	
14	Dover Iron Co.-----	Carlisle-----	19	ab Bear Spring-----	Bear Spring
	Dover Iron Co.-----	Carlisle-----	20	b Dover-----	Carlisle
	WASHINGTON COUNTY			WASHINGTON COUNTY	
15	Cranberry Furnace Co.-----	Johnson City-----	21	Cranberry-----	Johnson City
16	Embree Iron Co.-----	Embreeville-----	22	a Embree-----	Embreeville
	WAYNE COUNTY			WAYNE COUNTY	
17	Bon Air Coal and Iron Co.-----	Nashville-----	23	Mannie 1.-----	Allen's Creek
	Bon Air Coal and Iron Co.-----	Nashville-----	24	Mannie 2.-----	Allen's Creek

a Not active. b Cold blast, charcoal furnace.

The following table shows average number of employees, average number of days active, quantity of iron ore treated, percentage of yield of ore in iron and quantity of pig iron produced in Tennessee in 1912:

Pig iron employees, ore treated, and pig iron product in Tennessee in 1912.

COUNTY	Average Number of Employees	Average Number of Days Active	Iron Ore Treated (Long Tons)	Pig Iron Produced (Long Tons)	Yield of Ore in Iron (per cent)
Campbell.....	171	335	116,716	51,276	43.93
Dickson.....	85	75	12,078	5,844	46.73
Hamilton.....	125	107	50,074	19,175	38.29
Hickman.....	60	336	43,755	20,446	46.73
Lewis.....	122	345	67,358	33,539	49.79
Maury.....	47	234	11,588	6,697	57.79
Rhea.....	160	356	171,691	68,978	40.18
Roane.....	250	359	196,192	77,900	39.71
Stewart.....	31	173	5,326	2,685	50.41
Washington.....	82	306	71,551	28,608	39.98
Wayne.....	80	285	47,916	23,277	48.58
Total.....	1,213	265	794,245	338,225	42.58

RECAPITULATION.

Total average number of employees.....	1,213
Average wages paid per day.....	\$ 1.42
Total amount paid for labor.....	\$ 450,437
Total product (long tons).....	338,225
Total value of product.....	\$4,348,405
Average value per ton of product.....	\$ 12.86
Stock on hand beginning of year (long tons).....	65,252
Stock on hand end of year (long tons).....	43,416

MATERIAL USED IN THE MANUFACTURE OF PIG IRON.

Iron ore (long tons).....	794,245
Coke (short tons).....	566,238
Limestone flux (short tons).....	190,759
Mill cinders (long tons).....	341
Phosphate (long tons).....	11,244
Sand (long tons).....	2,521
Charcoal (bushels).....	423,525

CLASSIFIED PRODUCT AND VALUE OF PIG IRON.

This table shows the classified product and value of pig iron produced in Tennessee in 1912.

Classified product and value of pig iron in Tennessee in 1912.

CHARACTER OF PRODUCT	Amt. of Product (Long Tons)	Value of Product	Value per Ton of Product
Cold Blast.....	2,685	\$ 96,678	\$ 36.01
Ferro Phosphorus.....	6,697	285,292	42.60
No. 1 Soft.....	27,815	318,994	11.47
No. 2 Soft.....	46,176	552,188	11.96
No. 1 Foundry.....	267	3,236	12.12
No. 2 Foundry.....	86,610	1,001,507	11.56
No. 3 Foundry.....	31,936	359,023	11.24
No. 4 Foundry.....	28,616	306,720	10.68
Gray Forge.....	4,782	49,239	10.30
Over .05 Sulphur.....	22,788	258,407	11.34
Under .05 Sulphur.....	71,753	1,014,291	14.14
Mottled White.....	2,087	22,455	10.75
Silicon.....	6,013	81,275	13.53
Total.....	338,225	\$ 4,348,405	\$ 12.89

Quantity and value of pig iron marketed in the United States in 1910 and 1911, by states, in long tons.

STATE	1910		1911		Decrease in 1911		Percentage of Decrease in 1911	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Alabama.....	1,969,770	\$ 24,127,616	1,617,150	\$ 17,379,171	352,620	\$ 6,748,445	17.90	27.97
Illinois.....	2,606,335	41,465,543	2,036,081	31,152,927	570,254	10,312,616	21.88	24.87
Kentucky.....	81,677	1,312,288	57,982	870,542	23,695	441,746	29.01	33.66
Michigan.....	307,975	5,119,074	304,654	4,672,799	3,321	446,275	1.06	8.72
New Jersey.....	239,221	3,797,656	(a)	(a)	(a)	(a)	(a)	(a)
New York.....	1,896,018	31,698,623	1,537,201	28,924,194	358,817	7,769,429	18.88	24.51
Ohio.....	5,584,279	85,385,264	5,371,378	73,484,592	212,901	11,900,662	3.81	13.94
Pennsylvania.....	11,014,652	174,486,833	9,581,109	136,328,507	1,433,543	38,158,326	13.01	21.87
Tennessee.....	400,269	5,199,099	297,594	3,439,044	102,675	1,759,455	25.65	33.84
Virginia.....	402,625	5,576,599	308,789	3,898,285	93,836	1,678,314	23.31	30.10
Wisconsin.....	278,232	4,386,859	245,152	3,803,049	33,080	583,810	11.89	13.31
Other States (b).....	1,894,070	29,612,042	1,900,198	28,380,914	c 233,098	c 5,028,784	c 10.93	c 15.05
Total.....	26,674,123	\$412,162,486	23,257,288	\$ 327,334,624	3,416,835	\$84,827,862	12.81	20.68

a Included in "Other States."

b 1910: California, Colorado, Connecticut, Georgia, Indiana, Maryland, Massachusetts, Minnesota, Missouri, Washington, and West Virginia; 1911: California, Colorado, Connecticut, Georgia, Indiana, Maryland, Massachusetts, Minnesota, Missouri, New Jersey, and West Virginia.

c Includes decrease in New Jersey.

LIME

The total quantity of lime produced in Tennessee in 1912 was 95,690 short tons. The total value reached the amount of \$303,438. This was an increase over the previous year of 7,438 tons in quantity produced and an increase of \$31,072 in value of product. Tennessee ranked seventeenth as to value of product, in lime-producing states in 1911, but moved to fifteenth place in 1912. In the year 1912 her rank in lime-producing states, as to quantity of lime produced, was eleventh, while as to number of operations was fifteenth.

This table gives the number of employes engaged and the quantity and value of lime produced in Tennessee in 1912.

Lime products and other statistics in Tennessee in 1912.

COUNTY	Total Number of Employes	Quantity of Lime Burned (Short Tons)	Value of Lime Burned	Value of Lime (per Ton)
Coffee.....	17	7,749	\$ 26,797	\$ 3.46
Cumberland.....	100	18,000	54,000	3.00
Dickson.....	40	8,500	25,000	2.74
Franklin.....	75	22,400	74,800	3.34
Houston.....	100	14,000	50,500	3.61
Knox.....	59	19,259	55,119	2.86
Lawrence.....	2	12	60	5.00
Maury.....	4	150	750	5.00
Union.....	27	5,620	16,412	2.92
Total.....	424	95,690	\$ 303,438	\$ 3.17

RECAPITULATION.

Total average number of employes.....	424
Average wages paid per day.....	\$ 1.36
Total amount paid for labor.....	\$ 109,505
Total quantity of stone burned (short tons).....	153,853
Total value of stone burned.....	\$ 62,199
Estimated cost of fuel.....	\$ 69,000

USES OF LIME PRODUCT.

This table gives the production and value of lime produced in Tennessee in 1912.

Lime production in Tennessee in 1912, classified by uses.

USE	Quantity (Short Tons)	Value	Value per Ton
Building.....	32,761	\$ 102,407	\$ 3.13
Chemical Works.....	11,400	33,000	3.33
Dealers (uses not specified).....	21,433	73,035	3.41
Fertilizers.....	600	1,800	3.00
Hydrated.....	3,550	13,200	4.00
Paper Mills, Sulphate and Soda Pulp Works.....	22,616	64,506	2.85
Sugar Factories.....	2,500	7,000	2.80
Tanneries.....	830	2,490	3.00
Total.....	95,690	\$ 308,438	\$ 3.17

Fuel used in burning lime.

Coal (short tons).....	24,865	Lime Product (short tons).....	65,429
Wood (cords).....	7	Lime Product (short tons).....	12
{ Coal (short tons).....	5,425	{ Lime Product (short tons).....	30,249
{ Wood (cords).....	6,450		
		Total.....	95,690

MINERAL PAINTS

Mineral paints have been produced in three counties in this State, viz.: Bradley, James, and Wayne. Since 1907 there has been a gradual falling off in value of metallic paints produced in Tennessee. In 1907 the value of metallic paints produced in this State amounted to \$44,200; in 1911, \$17,400.

Metallic paint consists chiefly of red and brown iron oxides, produced either by grinding natural iron oxides or by roasting natural iron carbonate. The beds of Clinton hematite in New York, Tennessee and Georgia, the Lake Superior red hematite in northern Michigan, and the grey siderite near Lehigh Gap, Pennsylvania, are the chief sources of the raw ore supply.

The table below shows the quantity and value of the mineral paints produced in Tennessee in 1912:

Production and value of mineral paints in Tennessee in 1912.

COUNTY	Total Average Number of Employees	METALLIC PAINT		MORTAR COLORS		TOTAL	
		Quantity (Short Tons)	Value	Quantity (Short Tons)	Value	Quantity (Short Tons)	Value
Bradley.....	12	800	\$ 6,800			800	\$ 6,800
James.....	12			300	\$ 2,550	300	2,550
Total.....	24	800	\$ 6,800	300	\$ 2,550	1,100	\$ 9,350

RECAPITULATION.

Total average number of employees.....	24
Average wages paid per day.....	\$ 2 00
Total amount paid for labor.....	\$ 6,875

The following table gives the production of metallic paint from 1908 to 1911, inclusive:

Production of metallic paint, 1908-1911, by states, in short tons.

STATE	1908		1909		1910		1911	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Maryland.....	(a)	(a)	431	\$ 1,957	(a)	(a)	(a)	(a)
New York.....	2,924	\$ 28,090	2,553	25,533	b11,085	\$ 32,308	b 7,993	\$ 28,569
Pennsylvania.....	5,281	69,799	c8,120	105,683	8,063	91,714	7,676	100,837
Tennessee.....	a3,645	34,663	4,075	33,369	a3,907	26,680	a 3,282	25,381
Wisconsin.....	(d)	(d)	(d)	(d)	b 2,057	14,916	b 2,048	11,258
Other States (d).....	2,172	24,142	5,543	35,363	4,310	19,351	4 600	15,118
Total.....	14,022	\$ 156,694	20,722	\$ 201,905	29,422	\$ 184,869	25,599	\$ 181,163

a Maryland is included with Tennessee.

b Principally crude iron ore sold for paint.

c Includes a small quantity of Venetian red.

d "Other States" includes: 1908, California, Ohio, Vermont, Virginia, Wisconsin; 1909, California, Michigan, Ohio, Vermont, Washington, and Wisconsin; 1910, California, Georgia, Michigan, Missouri, Washington; 1911, Georgia, Michigan, Missouri, Virginia, and Washington.

MINERAL WATERS

It is not possible to determine the actual value of the mineral waters consumed, because the statistics only show the quantity and value of the waters sold, and do not take into account the large quantities given away at the springs. At many of the springs there are hotels operated by the owners or managers of the springs, and guests at these places are not required to pay for the spring water.

CONDITION OF THE MINERAL-WATER TRADE.

Compared with 1910, the sales of mineral waters in 1911 showed a net gain of 1,892,994 gallons, or 3.05 per cent. The increase in value amounted to \$480,298, or 7.55 per cent. The average price per gallon for the waters sold in 1911 showed a little more than a half a cent advantage over 1910, the averages being, respectively, 10.7 cents and 10 cents. In all probability these differences would be modified slightly if the reports had been received from all of the commercial springs, but in each year there are a few failures to report to the Geological Survey, rarely, however, for the same spring in any two years. For such springs the production has been estimated on the basis of the records in previous years. In 1910 there were 55 springs from which no reports were received. In 1911 the delinquent springs numbered 66. The output reported by these springs in 1910 was approximately 950,000 gallons, which has been estimated in 1911 at 800,000 gallons.

Out of the 41 states in which sales were reported from more than two springs, the production increased in 24 and decreased in 17. The largest increase was in New York, which showed a gain of 1,464,358 gallons. New Jersey came second, with 650,577 gallons, and Connecticut third, with 555,926 gallons. Two of the three largest decreases were reported from the adjoining states of Minnesota and Wisconsin, the former showing a decrease of 1,259,051 gallons, and the latter of 684,650 gallons. In Minnesota there was a general decrease, most of the springs reporting fewer sales in 1911 than in 1910, and one company which reported about 1,000,000 gallons in 1910 was in the hands of a receiver and had no production in 1911. Louisiana was next to Minnesota in the quantity of decrease, with 792,450 gallons, and New Hampshire was fourth, with 300,168 gallons. There were three states in 1911 which showed increased production, but decreased values; these were Alabama, Illinois, and Kentucky. Montana showed a decrease in production with a slight increase in value.

The largest percentages of increase were in Washington, 376.92 per cent, and Oklahoma, 332.24 per cent; the largest percentages of decrease were in Vermont, 81.72 per cent, Montana, 79.12 per cent, and New Hampshire, 42.46 per cent.—*U. S. G. S.*

The sales in Tennessee in 1911 amounted to 1,016,456 gallons, in 1912 they amounted to 901,697 gallons. This was a decrease of more than 100,000 gallons, but an increase in value of \$3,875.

MINERAL WATERS

This table gives the quantity and value of mineral waters sold in Tennessee in 1912.

Production and value of mineral waters in Tennessee in 1912.

COUNTY	No. of Springs Reporting Sales	Quantity Sold (Gallons)	Average Retail Price per Gallon at Spring	VALUE OF WATER SOLD		
				Medicinal Purposes	Table Purposes	Total
Cheatham.....	2	5,495	\$.116	\$ 592	\$ 45	637
Davidson.....	6	637,000	.058	22,608	14,608	37,216
Franklin.....	1	336	.500	168	-----	168
Grainger.....	3	130,060	.292	38,024	-----	38,024
Hawkins.....	2	34,821	.124	4,324	-----	4,324
Knox.....	1	35,000	.100	3,500	-----	3,500
Macon.....	2	10,000	.208	2,080	-----	2,080
Montgomery.....	1	320	.100	32	-----	32
Rhea.....	1	24,000	.060	1,440	-----	1,440
Unicoi.....	1	480	.150	72	-----	72
Warren.....	1	5,000	.100	500	-----	500
Wilson.....	2	19,125	.172	3,281	-----	3,281
Total.....	23	901,697	.101	\$ 76,621	\$ 14,653	\$ 91,274

Name and location of mineral springs in Tennessee.

COUNTY	NAME OF SPRING	LOCATION OF SPRING	POST OFFICE
Blount.....	Montvale.....	Chilhowie Mountain.....	Newport
Blount.....	Mt. Nebo.....	Chilhowie Mountain.....	Walland
Cheatham.....	Bright.....	Near Ashland City.....	Ashland City
Cheatham.....	Willow Brook.....	Craggie Hope.....	Craggie Hope
Davidson.....	Bush Epsom Lithia.....	Nolensville Road, 3 mi.....	Nashville
Davidson.....	French Lick Sulphur.....	North Nashville.....	Nashville
Davidson.....	Larkin.....	Madison.....	Nashville
Davidson.....	Pioneer Lithia.....	Near Nashville.....	Nashville
Davidson.....	Richardson's Lockland.....	Nashville, 3 mi.....	Nashville
Davidson.....	Thompson's.....	Nashville, R.F.D. 1.....	Nashville
Franklin.....	Eastbrook.....	Eastbrook.....	Eastbrook
Grainger.....	Avondale.....	Rutledge, 4 mi.....	Rutledge
Grainger.....	Gammon's.....	Tate Springs, 4 mi.....	Tate
Grainger.....	Heacker.....	Tate.....	Tate
Grainger.....	Lea.....	Lea Springs.....	Lea Springs
Grainger.....	Tate.....	Tate Springs.....	Tate Springs
Hawkins.....	Galbraith.....	Galbraith Springs.....	Galbraith Springs
Hawkins.....	Price's.....	Klondike, 2½ mi.....	Klondike
Hawkins.....	Kyle's.....	Near Rogersville.....	Rogersville
Hawkins.....	Wright's Epsom Lithia.....	Mooresburg.....	Mooresburg
Jefferson.....	Highland.....	Joppa, R.F.D.....	New Market
Knox.....	Whittle.....	Near Knoxville.....	Whittle Springs
Macon.....	Epperson.....	Westmoreland, 2½ mi.....	Westmoreland
Macon.....	Red Boiling.....	Red Boiling Springs.....	Red Boiling Springs
Montgomery.....	Idaho.....	Near Clarksville.....	Clarksville
Rhea.....	Morgan's.....	Walden's Ridge.....	Morgan Springs
Rhea.....	Rhea.....	Rhea Springs.....	Rhea Springs
Sumner.....	Tyree.....	Hendersonville, 10 mi.....	Hendersonville
Unicoi.....	Unaka.....	Unaka Springs.....	Unaka Springs
Warren.....	Faulkner.....	McMinnville.....	McMinnville
Wilson.....	Hamilton.....	Horn Springs.....	Lebanon, R.F.D. 5
Wilson.....	Horn.....	Horn Springs.....	Horn Springs

PHOSPHATE ROCK

There are only two distinct types of phosphate rock being mined in Tennessee at the present time. These are known as the brown phosphate and the blue phosphate. There is also a white phosphate found in Tennessee, but this is not mined to any appreciable extent, there being only 300 tons reported from Maury County in 1912, the price being \$5.00 per ton. This is probably due to its uncertain character, the expense attendant upon its mining, and its inaccessibility.

Phosphate deposits occur in the central portion of Tennessee in the counties of Maury, Hickman, Giles, Lewis, Williamson, Perry, Marshall, and Sumner.

The principal part of the phosphate mined in this State is the brown rock, which usually occurs in thin strata interbedded with clay and occasionally with limestone, with an overburden of earth or clay from 5 to 20 feet or more in thickness. It is mined entirely by surface working. The overburden is first removed by stripping, usually, in operations of any size by steam shovels or excavators. Where light, it may be economically removed by wheeled scrapers. The mining is done in open pits with steam shovel loading into side-dump cars. The rock is of a soft, stratified nature, and usually mixed with clay or other foreign material.

The rock is crushed and washed, then thoroughly dried, after which it is finely ground. The brown rock where mined carries as much as 80 per cent tricalcium phosphate.

The blue rock occurs as a bedded formation, usually between hard slate or limestone strata, which forms the roof and floor of the mine. The bedded rock occurs in seams varying from 1 to 50 inches in thickness, but the high-grade rock is rarely more than 28 inches thick. Where mined, this strata or seam of blue rock is usually about two feet thick.

The mines are opened on the outcrop as drift mines, and are worked very much in the same manner as thin-seam coal mines; that is, on the single or double entry room and pillar system, the pillars being drawn after the rooms are worked out. The method of preparing the rock is somewhat similar to that of the brown rock, except that washing is not necessary.

This table gives the name and the postoffice address of the operators and superintendents of phosphate plants in Tennessee by counties for 1912.

Phosphate operators and superintendents in Tennessee in 1912.

No.	OPERATOR		SUPERINTENDENTS	
	COUNTY AND NAME	POST OFFICE	COUNTY AND NAME	POST OFFICE
	GILES COUNTY		GILES COUNTY	
1	American Phosphate Mining Co.	Wales	A. J. Robertson	Wales
2	Charleston S.C.M. & Mfg. Co.	Mt. Pleasant	M. H. Wright	Wales
3	Consolidated Phosphate Co.	Columbia	John W. Fry	Columbia
4	International Agr. Corporation	115 Brdwy, N. Y.	G. W. Killebrew	Mt. Pleasant
	HICKMAN COUNTY		HICKMAN COUNTY	
5	American Phosphate Mining Co.	New York	A. J. Robertson	Centreville
6	Bear Creek Phosphate M. & M. Co.	Columbia	W. B. White	Columbia, R.R. 9
7	Chickamauga Fertilizer Works	Atlanta, Ga.	J. D. McCarty	Atlanta, Ga.
8	Consolidated Phosphate Co.	Columbia	John W. Fry	Columbia
9	Corn Belt Phosphate Co.	Centreville	F. Hillsman	Centreville
10	International Agr. Corporation	115 Brdway, New York	G. W. Killebrew	Mt. Pleasant
11	Meridian Fertilizer Factory	Meridian, Miss.	A. J. Robertson	Centreville
12	Prescott Phosphate Mining Co.	Boston, Mass.	J. D. C. Bradley	92 State St., Boston
13	Standard Guano & Chem. Mfg. Co.	New Orleans, La.		Centreville
14	Tenn. Cotton Oil Co.	Memphis	J. Myers	Twomey
15	Volunteer State Phosphate Co.	Centreville	S. M. Ward	Centreville
	LEWIS COUNTY		LEWIS COUNTY	
16	Charleston S. C. M. & Mfg. Co.	Mt. Pleasant	M. H. Wright	Gordonsburg
17	Consolidated Phosphate Co.	Columbia	John W. Fry	Columbia
18	Dr. S. C. Long	Spring Hill		
	MARSHALL COUNTY		MARSHALL COUNTY	
19	F. H. Gault	Cornersville	F. H. Gault	Cornersville
	MAURY COUNTY		MAURY COUNTY	
20	Akin Phosphate Co.	Columbia	R. C. Ewing	Columbia
21	Bear Creek Phos. M. & Mfg. Co.	Columbia	W. B. White	Columbia
22	Brown Rock Phosphate Co.	Mt. Pleasant	D. W. Shofner	Mt. Pleasant
23	Central Phosphate Co.	Mt. Pleasant	M. H. Gray	Mt. Pleasant
24	Century Phosphate Co.	Columbia	A. E. Sheldon	Columbia
25	Charleston S.C.M. & Mfg. Co.	Mt. Pleasant	J. W. Burnett	Mt. Pleasant
26	Charleston S. C.M. & Mfg. Co.	Mt. Pleasant	J. W. Burnett	Mt. Pleasant
27	Columbia Mining & Mfg. Co.	Columbia		
28	Consolidated Phosphate Co.	Columbia	John W. Fry	Columbia
29	Farmers Ground Rock Phos. Co.	Mt. Pleasant	Wm. Stewart	Mt. Pleasant
30	Globe Phosphate Co.	Columbia	T. Ed. New	Columbia
31	Great Western Phosphate Co.	Mt. Pleasant		
32	Independent Phosphate Co.	Columbia	O. L. Dortch	Columbia
33	International Agr. Corporation	115 Brdway, New York	W. C. Napier	Mt. Pleasant
33a	International Agr. Corporation	115 Brdway, New York	W. C. Napier	Mt. Pleasant
34	International Agr. Corporation	115 Brdway, New York	W. C. Napier	Mt. Pleasant
34a	International Agr. Corporation	115 Brdway, New York	W. C. Napier	Mt. Pleasant
34b	International Agr. Corporation	115 Brdway, New York	H. O. Pickard	Mt. Pleasant
35	International Phosphate Co.	Nashville	S. W. Harris	Columbia, R.F.D. 1
36	Blue Grass Phosphate Co.	Mt. Pleasant	E. F. Ligon	Mt. Pleasant
37	Kittrell Bros.	Mt. Pleasant	J. W. Kittrell	Mt. Pleasant
38	Dr. S. C. Long	Spring Hill		
39	Mt. Pleasant Bone Phosphate Co.	Mt. Pleasant	A. P. Thweatt	Mt. Pleasant
40	Petrified Bone Mining Co.	Mt. Pleasant	J. J. Jones	Mt. Pleasant
41	Phosphate Supply Co.	Mt. Pleasant	E. F. Ligon	Mt. Pleasant
42	Preston Mining Co.	Columbia	J. H. Morgan	Columbia
43	Tennessee Phosphate Co.	Mt. Pleasant	A. E. Sheldon	Columbia
44	Williams Phosphate Co.	Mt. Pleasant	D. C. Y. Clark	Mt. Pleasant
45	W. V. Wilson	Mt. Pleasant		
	PERRY COUNTY		PERRY COUNTY	
46	Perry Phosphate Co.	Nashville	Robin Jones	Steger Bldg., Nash.
	SUMNER COUNTY		SUMNER COUNTY	
47	United States Fertilizer Co.	Gallatin	H. C. Stiefel	Gallatin
	WILLIAMSON COUNTY		WILLIAMSON COUNTY	
48	F. F. Clawson	Ashwood		
49	International Agr. Corporation	115 Brdway, N.Y.	G. W. Killebrew	Mt. Pleasant

PHOSPHATE VALUES AND CLASSIFIED PRODUCT.

This table gives the number of employes, the wages paid, the total amount paid for labor in phosphate industries in Tennessee in 1912; also the value of the product.

COUNTY	EMPLOYES			PRODUCT (Long Tons)				Value of Product
	Total Average Number	Average Wages Paid per Day	Total Amount Paid for Labor	Blue Rock	Brown Rock	White Rock	Total	
Giles.....	106				34,112		34,112	\$ 119,391
Hickman.....	52			480	3,250		3,700	a12,550
Lewis.....	220			73,880			73,880	240,110
Maury.....	1,131				331,073	300	331,373	b1,170,937
Total.....	1,508	\$ 1.51	\$ 583,493	74,330	368,435	300	443,065	\$ 1,542,988

a Blue rock values amount to \$1,550

b White rock values amount to \$1,500.

Phosphate product and value in Tennessee in 1912, compared with 1911.

COUNTY	1912		1911		Increase + or Decrease -	
	Product (LongTons)	Value	Product (LongTons)	Value	Product (LongTons)	Value
Giles.....	34,112	\$ 119,391	19,711	\$ 70,302	+ 14,401	+ \$ 49,089
Hickman.....	3,700	12,550	17,768	54,687	- 14,068	- 42,137
Lewis.....	73,880	240,110	64,004	224,014	+ 9,876	+ 16,096
Maury.....	331,373	1,170,937	440,628	1,568,674	- 109,255	- 397,737
Sumner.....			650	812	- 650	- 812
Total.....	443,065	\$ 1,542,988	542,761	\$ 1,918,489	- 99,696	- \$375,501

The following table gives total product and value of phosphate rock in Tennessee from 1894, the initial year of production, to 1912, inclusive:

Product and values of phosphate rock in Tennessee, 1894-1912, inclusive.

YEAR	Product (Long Tons)	Value	Value per ton	YEAR	Product (Long Tons)	Value	Value per ton
1894.....	19,188	\$ 67,158	\$ 3.50	1904.....	468,443	\$ 1,485,665	\$ 3.17
1895.....	38,515	82,160	2.13	1905.....	505,204	1,580,849	3.13
1896.....	26,157	57,370	2.20	1906.....	499,815	1,852,840	3.71
1897.....	128,723	193,115	1.50	1907.....	654,641	2,396,169	4.42
1898.....	308,107	498,392	1.62	1908.....	415,388	1,625,890	3.91
1899.....	462,561	1,272,022	2.75	1909.....	348,841	1,135,574	3.25
1900.....	450,856	1,352,568	3.00	1910.....	406,684	1,234,909	3.01
1901.....	394,139	1,186,033	3.01	1911.....	542,761	1,918,489	3.53
1902.....	454,078	1,341,161	2.95	1912.....	443,065	1,542,988	3.48
1903.....	445,510	1,434,660	2.95				
				Total.....	7,015,766	\$ 22,758,072	\$ 3.24

PHOSPHATE ROCK—SALES AND DISPOSITION OF PRODUCT.

This table shows the quantity of stock on hand at the beginning and at the close of the year; also the average price received for the domestic and the export product, by counties, for 1912.

Stock on hand, sales and prices obtained for phosphate rock in Tennessee in 1912.

COUNTY AND KIND OF PRODUCT	STOCK ON HAND		SALES		Sale Price per Ton
	Beginning of Year (Long Tons)	End of Year (Long Tons)	Quantity (Long Tons)	Amount	
Giles (Brown Rock)	4,780	12,859	26,033	\$ 91,115	\$ 3.50
Hickman:					
{ Blue Rock	6,120	6,530	450	1,550	3.44
{ Brown Rock			3,280	11,000	3.38
Lewis (Blue Rock)	1,551	15,060	60,370	196,203	3.25
Maury:					
{ Brown Rock	71,980	110,260	296,085	1,182,686	3.99
{ White Rock			300	1,500	5.00
Total	84,411	144,709	386,488	\$ 1,484,054	\$ 3.84

QUARTZ

Tennessee was the largest producer of quartz in 1912, but ranked third in value of product. The product is of low grade and is used as flux in copper smelting.

The large production in Tennessee is responsible for the increase in the output of crude quartz and for the low average of value of this variety. (U. S. G. S.)

The quartz used in Tennessee is the massive crystalline form, which is hard vitreous quartzite of Cambrian age. It usually occurs in veins or dike-like masses, and in some sections much of the surface rock is of this material.

The use of quartz in Tennessee is at present confined to copper smelting in the Ducktown district of Polk County, where it is used as an ingredient in the flux.

The quartz here reported is obtained partly from the quarry of the Tennessee Copper Company, located at Austral, in Polk County; also from surface rock collected in the vicinity of the smelters.

The following table shows the operations in 1912:

Total average number of employees	29
Average wages paid per day	\$ 1.76
Total amount paid for labor	\$ 15,734
Total quartz product (short tons)	55,175
Total value	\$ 29,792

SAND AND GRAVEL

The total production of sand and gravel in the United States in 1912, reported to the U. S. Geological Survey by producers, was 68,318,877 short tons, valued at \$23,-081,555, as compared with 66,846,959 short tons, valued at \$21,158,583 in 1911; a net increase in quantity of 1,471,918 short tons, and in value of \$1,922,972 over the production in 1911.

The quantity and value of glass sand produced in 1912 was lower than that in the two preceding years. The production amounted to 1,465,386 short tons, valued at \$1,430,471, as compared with 1,538,666 short tons, valued at \$1,543,733 in 1911.

Most of the sand and gravel produced in Tennessee is dredged from the Mississippi and Tennessee rivers.

This table gives the product of sand and gravel in Tennessee for 1912; also the value of the product. The classification is by uses in cubic yards of 2,500 pounds.

Sand and gravel product in Tennessee in 1912.

COUNTY	Total Number of Employees	1		2		3		4		5		6	
		GL. SAND		MOLDING SAND		BUILDING SAND		STONE SAND		ENGINE SAND		FURNACE SAND	
		Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Benton.....	12												
Carter.....	8					12,306	\$ 5,170			2,717	\$ 1,208	1,396	\$ 545
Davidson.....	49			1,000	\$ 1,500	25,310	22,029			25,191	12,827	250	225
Fayette.....	14	123	\$ 216	8,992	3,984	28,234	12,467			89	111		
Hamilton.....	43			8,884	7,684	29,090	27,200	288	\$ 450				
Hardeman.....	21	975	900	4,000	2,000	11,390	4,767	2,000	1,000	1,810	266		
Henry.....	5			800	500	100	50						
Knox.....	34			15,630	7,895			10,000	5,000	12,000	4,900		
Madison.....	1			80	100								
Marion.....	10					7,000	5,800						
Roane.....	20					9,550	7,180					736	320
Shelby.....	75					94,968	66,694			32,000	9,295		
Total...	292	1098	\$1116	39,386	\$ 23,663	217,558	\$ 151,127	12,288	\$ 6,450	73,807	\$ 28,499	2,382	\$ 1,090

Sand and gravel product in Tennessee in 1912—continued.

COUNTY	7		8						9	
	Other Sand		Roofing Gravel		Gravel Concrete		Road Making Gravel		Total	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Benton.....							50,652	\$ 18,551	50,652	\$ 18,551
Carter.....									16,419	6,921
Davidson.....			7,592	\$ 3,846	15,502	\$ 8,504			74,845	48,931
Fayette.....									37,438	16,778
Hamilton.....	2,884	\$ 3,334	500	750	5,000	6,250			46,556	45,668
Hardeman.....	24,000	6,000							44,175	14,927
Henry.....							660	165	1,560	715
Knox.....	35,596	17,798							73,226	35,493
Madison.....									80	100
Marion.....									7,000	5,600
Ronne.....									10,286	7,470
Shelby.....			1,836	3,893	141,926	131,372	83,969	37,753	354,699	249,007
Total.....	62,480	\$ 27,132	9,928	\$ 8,489	162,428	\$ 146,126	135,261	\$ 56,469	716,936	\$ 450,161

RECAPITULATION.

Total average number of employes.....	292
Average wages paid per day.....	\$ 1.60
Total amount paid for labor.....	\$ 109,832

Product and value by uses.

KIND OF PRODUCT	Quantity (Cubic Yards 2600 lbs.)	Total Value	Value per Cubic Yard
BUILDING SAND:			
Concrete.....	174,084	\$ 125,830	\$ 0.72
Mortar.....	43,774	25,297	0.58
Total Building Sand.....	217,858	\$ 151,127	\$ 0.69
Glass Sand.....	1,036	1,116	1.02
Molding Sand.....	39,386	23,663	0.59
Stone Sand.....	12,288	6,450	0.52
Engine Sand.....	73,807	28,499	0.39
Furnace Sand.....	2,382	1,090	0.46
Other Sand.....	62,480	27,132	0.43
Total Sand.....	409,299	\$ 239,077	\$ 0.58
GRAVEL:			
Roofing.....	9,928	\$ 8,489	\$ 0.86
Concrete.....	162,428	146,126	0.90
Road Making.....	135,281	56,469	0.42
Total Gravel.....	307,637	\$ 211,084	\$ 0.69
Grand Total Sand and Gravel.....	716,936	\$ 450,161	\$ 0.63

STONE

The total value of all stone produced in Tennessee in 1912 was \$1,522,172. The total value for 1911 was \$1,409,550.

This report does not include the limestone used in the manufacture of Portland cement, nor that burned into lime. The following table shows the total product and value of all stone produced in Tennessee for 1912 compared with that of 1911.

Stone product and value in Tennessee in 1912, compared with 1911.

YEAR	LIMESTONE		MARBLE		SANDSTONE		Total Value
	Quantity (Short Tons)	Value	Quantity (Cubic Feet)	Value	Quantity (Short Tons)	Value	
1912.....	962,109	\$ 491,290	685,186	\$ 1,022,132	3,125	\$ 8,750	\$ 1,522,172
1911.....	1,087,375	555,293	484,096	853,557	450	700	1,409,550
Increase + or Decrease	- 125,266	-\$ 64,003	+ 201,091	+\$168,575	+ 2,675	+\$ 8,050	+\$112,622

The table below gives the total value of stone produced in Tennessee in 1912, and also the purposes for which the stone was used:

Value of limestone, marble and sandstone in Tennessee in 1912, and purposes for which it was used.

KIND	Building (Dressed and Rough)	Interior Decorations	Monumental (Dressed and Rough)	Rubble	Riprap	Crushed Stone	Blas Furnace Flux	Other (Dressed and Rough)	Total
Limestone.....	\$ 4,809			\$ 2,074	\$ 5,285	\$ 326,679	\$ 71,322	\$ 81,121	\$ 491,290
Marble.....	216,153	\$ 585,371	\$ 24,268					196,340	1,022,132
Sandstone.....	8,750								8,750
Total.....	\$ 229,712	\$ 585,371	\$ 24,268	\$ 2,074	\$ 5,285	\$ 326,679	\$ 71,322	\$ 277,461	\$ 1,522,172

STONE USED FOR BUILDING PURPOSES.

This table shows the value of limestone, marble and sandstone produced in 1912 and used for the construction of buildings.

Value of stone produced in Tennessee in 1912, used for building purposes.

KIND	Rough	Dressed	Total
Limestone.....	\$ 4,469	\$ 340	\$ 4,809
Marble.....	85,853	130,500	216,153
Sandstone.....	8,750		8,750
Total.....	\$ 99,072	\$ 130,840	\$ 229,712

LIMESTONE

This table gives the number of employes engaged and the value of the product in limestone production in Tennessee for 1912.

Value of limestone produced in Tennessee in 1912, by uses.

COUNTY	Total Average Number of Employes	Building (Rough)	Building (Dressed)	CRUISING STONE			Blast Furnace Flux	Rubble	Riprap	Curbing	Other	Total Value
				Road Making	Railroad Ballast	Concrete						
Campbell.....	53			\$ 1,667	\$ 2,395	\$ 1,681	\$ 22,912					\$ 28,655
Carter.....	25						14,881				\$ 518	15,399
Coffee.....	20				4,705						317	5,022
Davidson.....	371	\$ 1,705		86,213	24,557	57,756			\$ 5,285		1,031	176,547
Dickson.....	20						2,949					2,949
Franklin.....	60				13,000	2,100					1,150	16,250
Giles.....	50	330	\$ 340		7,000							7,670
Hamblen.....	10			3,730								3,730
Hamilton.....	55	2,424		23,991	19,407	9,858	65	\$ 874		\$275	1,019	57,923
James.....	11						1,806					1,806
Knox.....	30			16,800		15,000					1,000	32,800
Marion.....	38										75,568	75,568
Marshall.....	3			263								263
Maury.....	69			42	891	1,296	11,336				43	14,108
Rhea.....	55				12,307		11,300					23,607
Roane.....	42			10,050		11,250	4,930	1,200				27,430
Rutherford.....	2			720								720
Stewart.....	2						643					643
Washington.....	4										200	200
Total.....	920	\$ 4,469	\$ 340	\$ 143,476	\$ 84,262	\$ 96,941	\$ 71,322	\$ 2,074	\$ 5,285	\$275	\$ 80,846	\$ 491,290

RECAPITULATION.

Total average number of employes..... 920
 Average wages paid per day.....\$ 1.52
 Total amount paid for labor.....\$ 280,455

LIMESTONE PRODUCT AND VALUE BY USES.

This table gives the total product and the value of the limestone produced in Tennessee in 1912 by uses.

Product and value of limestone in Tennessee in 1912 by uses.

KIND OF PRODUCT	Amount (Short Tons)	Value	Value Per Ton
BUILDING;			
Dressed.....	45	\$ 340	\$ 7.56
Rough.....	3,220	4,460	1.39
Total Building.....	3,265	4,800	1.47
CRUSHED STONE.			
Road Making.....	209,774	143,476	0.68
Railroad Ballast.....	184,738	84,262	0.45
Concrete.....	150,058	98,941	0.66
Total crushed stone.....	545,170	326,679	0.60
Rubble.....	1,916	2,074	1.08
Riprap.....	12,263	5,285	0.43
Plast Furnace Flux.....	140,728	71,322	0.51
Cement Plants.....	251,892	75,568	0.30
Agriculture.....	4,341	4,037	0.93
Other Limestone.....	2,509	1,241	0.49
Total.....	413,649	150,527	0.39
Curbing.....	25	275	11.00
Total.....	25	275	11.00
Grand total.....	962,109	491,290	0.51

MARBLE

The marble found in Tennessee varies in color from a very dark chocolate to an almost pure white.

Tennessee ranks third as a marble-producing State, Vermont being first and Georgia second.

In the value of marble used for interior decoration purposes Tennessee held second place and Vermont first.

In 1911 the commercial output of marble came from Vermont, Georgia, Colorado, Tennessee, New York, Alabama, Massachusetts, North Carolina, Kentucky, New Mexico, South Carolina, Utah and Oregon, named in order of value of output.

The marble output in the United States was valued in 1910 at \$6,992,779, and in 1911 at \$7,546,718, a gain of \$553,939. The chief uses of marble are as building stone, for interior and exterior work, and for monuments.

The East Tennessee marble area averages about twenty miles in width and something over 125 miles in length, extending from the Virginia line southwestward to McMinn County. The area is traversed by the Southern Railway and the Louisville and Nashville Railroad.

Red variegated marbles are found in several counties west of the Cumberland tableland, notably on Elk River in Franklin County, and on Leipers Creek in Maury County.

Variegated marbles are also found in West Tennessee in the counties of Henry, Benton, Perry, Decatur, Wayne and Hardin.

A brownish red marble is found on Shoal Creek in Lawrence County. A fine quality of dove-colored marble is found in Davidson, Wilson and Coffee counties. A pale yellow marble, with serpentine veins of red and black dots, is found in Rutherford County.

Cave marble (cave onyx)—Cave marble is found in a number of places near Agee, in Campbell County. The Crystal Onyx Co., of Atlanta, Ga., was formed recently to develop these properties, and openings have been made on several of the deposits.

One of the most notable caves of East Tennessee is the Cadle, or Powell River Cave, in the valley of Powell River, about six miles southwest of Cumberland Gap. At a certain place in this cave the wall on one side is covered from floor to ceiling by a mass resembling two half-columns, and in the intervening space the floor is covered in places several feet deep by an irregular deposit of cave marble. This and some of the other larger masses would undoubtedly furnish some workable material, though no reliable estimate can be made of the amount of its value.

Masses of cave marble have been noted in many other places in Tennessee.

(The above facts in reference to Cave Marble are taken from "Resources of Tennessee," August, 1912.)

This table gives the number of employees and the value of the marble produced in Tennessee in 1912, by counties.

Value of marble product in Tennessee in 1912, classified by uses.

COUNTY	Total Average Number of Employees	ROUGH			DRESSED				Grand Total
		Building	Monumental	Other Purposes	Building	Monumental	Interior Decorations	Other Purposes	
Blount.....	206	\$ 19,821	-----	-----	-----	-----	\$ 153,815	-----	\$ 173,636
Hawkins.....	18	-----	-----	-----	-----	-----	3,600	\$ 3,500	7,100
Knox.....	781	\$ 65,832	\$ 19,268	\$ 47,860	\$ 190,500	\$ 5,000	426,326	112,680	807,456
Loudon.....	15	-----	-----	-----	-----	-----	1,630	-----	1,630
Union.....	58	-----	-----	16,750	-----	-----	-----	15,560	32,310
Total.....	1,070	\$ 85,653	\$ 19,268	\$ 64,600	\$ 190,500	\$ 5,000	\$ 585,371	\$ 131,740	\$ 1,022,132

RECAPITULATION.

Total average number of employees.....	1,070
Average wages paid per day.....	\$ 1.47
Total amount paid for labor.....	\$ 402,292

Product and value by uses.

KIND OF PRODUCT	Quantity (Cu. Ft.)	Value	Value per Cu. Ft.	Per cent Tot. Val.
Rough:				
Building.....	66,026	\$ 85,653	\$ 1.30	8.38
Monumental.....	17,334	19,368	1.11	1.88
Other Purposes.....	65,140	64,600	.99	6.33
Total Rough.....	148,499	\$ 169,521	\$ 1.14	16.58
Dressed:				
Building.....	82,177	\$ 130,500	\$ 1.59	12.77
Monumental.....	1,000	5,000	5.00	0.49
Interior Decorations.....	402,778	585,371	1.45	57.27
Other Purposes.....	80,732	131,740	2.60	12.89
Total Dressed.....	566,687	\$ 852,611	\$ 1.59	83.42
Grand Total.....	685,186	\$ 1,022,132	\$ 1.49	100.00

The value of marble product in Tennessee from 1898 to 1912, inclusive, is as follows:

Year	Value	Year	Value	Year	Value
1898.....	\$ 216,841	1903.....	\$ 438,450	1908.....	\$ 761,222
1899.....	334,705	1904.....	523,872	1909.....	590,585
1900.....	424,054	1905.....	536,739	1910.....	877,432
1901.....	494,637	1906.....	576,259	1911.....	853,557
1902.....	518,256	1907.....	699,041	1912.....	1,022,132

SANDSTONE.

The table below gives the value of sandstone produced in Tennessee in 1912, the number of employees engaged, and the uses by counties.

Value of sandstone product in Tennessee in 1912 by counties and uses.

COUNTY	Total Average No. of Employee	Rough Building	Total
Franklin.....	8	\$ 8,750	\$ 8,750
Total.....	8	\$ 8,750	\$ 8,750

RECAPITULATION.

Total average number of employees.....	8
Average wages paid per day.....	\$ 1.50
Total amount paid for labor.....	\$ 1,000

Product and value by uses.

KIND	Quantity (short tons)	Value	Value per Ton
Building:			
Dressed.....			
Rough.....	3,125	\$ 8,750	\$ 3.50
Total.....	3,125	\$ 8,750	\$ 3.50

ZINC AND LEAD

The production and value of zinc show an increase over the preceding year, one operation alone working in the carbonates being the principal producer; however, development has been carried on all during the year by the American Zinc Co. of Tennessee, at Mascot, a modern mining and milling plant being in process of installation. In the process of development of the mine quite a considerable amount of ore has been removed, and is held on dump for future treatment. This, however, is not included in this year's statistics.

This ore is sphalerite, known also as sulphides or blends, the ore body being a brecciated dolomite and limestone formation of the Knox dolomite.

The Grasselli Chemical Co., operating at New Market, is working entirely in the smithsonite, or carbonates, partially by underground mining, but largely in open cut work. The ore lies on and around large irregular masses of dolomite, known as pinnacles, under 30 to 60 feet of an overburden of clay. After this has been removed with steam shovels the ore is removed by hand.

The underground mines of this company, as also those of the American Zinc Co., are regularly inspected by this department, and descriptions of same will be found elsewhere in this report following the coal mine descriptions.

The treatment of both ores here mentioned is by water concentration by means of jigs and tables, the details of each, however, being somewhat dissimilar as warranted by the different characteristics of the ore. The concentrate is shipped as such, no smelting of zinc now being done in this State.

While the present operations are now confined to a small area in the vicinity of Mascot and New Market in Knox and Jefferson counties, the possible area in which zinc may be found is much more extensive, as is shown by the following from State Geologist Dr. A. H. Purdue, in his bulletin on "The Zinc Deposits of Northeastern Tennessee."

"The zinc mines and prospects in Tennessee lie north and northeast of Knoxville, and are included within a northeast, southwest area, forty miles wide and eighty miles in length. They include what will be known as the Holston River group, located in the valley of Holston River in Knox and Jefferson counties; the Powell River group, located near the river by that name, in Unicoi and Claiborne counties; the Straight Creek group, located on Straight Creek, Claiborne County; the Fall Branch group, in Sullivan County; and the Jearoldstown group in Greene County. Besides these, there is a prospect three miles east of White Plains in Jefferson County, known as the Felknor mine."

The production of zinc has always been a minor industry in this State, and while the area in which zinc may be found is quite considerable, until recently there has been little success in its development.

A very rich ore body, even though small, can be usually worked on a small scale with some profit. A lower grade proposition, however, can be worked successfully only by handling the ore in large quantities in modern and costly plants. Much preliminary work must be done in approximating the amount of ore obtainable before the erection of such plants are justified, and the company must have territory available for a reasonable life for such a plant.

While as yet it is impossible to predict to what extent zinc will be developed in Tennessee, yet from what is being done the future in this line looks encouraging, and there seems to be little doubt but that it will soon take a place as a mineral resource of some importance in this State.

Although there is considerable variation in the Tennessee ores, the following assays,

taken from "Bulletin 14, The Zinc Deposits of Northeastern Tennessee," by A. H. Purdue, State Geologist, will show the general characteristics of the two principal ores:

Sphalerite—From the American Zinc Company's Mine, Mascot.

Moisture	.06	per cent.
Metallic zinc	62.00	per cent.
Iron	.26	per cent.
Insoluble residue	4.64	per cent.
Sulphur	30.46	per cent.
Manganese	.007	per cent.
Copper	Trace.	
Lead	Trace.	

Smithsonite—From the Grasselli Chemical Company's Mine, New Market.

Moisture	.32	per cent.
Zinc	45.03	per cent.
Iron	.33	per cent.
Insoluble residue	10.60	per cent.
Calcium carbonate	.50	per cent.
Manganese	.022	per cent.
Magnesium carbonate	Trace.	
Copper	Trace.	
Lead	Trace.	
Equivalent to zinc carbonate.....	86.25	per cent.

ZINC AND LEAD.

The following table gives lead and zinc operations in Tennessee in 1912 by counties:

Zinc and lead operations in Tennessee in 1912.

COUNTY	Average Number of Employees	ORES				METAL CONTENT			
		Lead Concentrates—Carbonate		Zinc Concentrates Blende and Carbonate		Lead		Zinc	
		Quantity (Short Tons)	Value	Quantity (Short Tons)	Value	Quantity (Pounds)	Value	Quantity (Pounds)	Value
Jefferson.....	232			5,690	\$ 113,800			4,552,000	\$ 245,800
Total.....	232			5,690	\$ 113,800			4,552,000	\$ 245,800

RECAPITULATION.

Total average number of employees.....	232
Average wages paid per day.....	\$ 1.99
Total amount paid for labor.....	\$ 114,213

Zinc and lead product and value in Tennessee, 1902-1912.

YEAR	ORES				METAL CONTENT			
	Lead Concentrates Carbonate		Zinc Concentrates Blende Carbonate		Lead		Zinc Blende & Carbonate	
	Quantity (Short Tons)	Value	Quantity (Short Tons)	Value	Quantity (Pounds)	Value	Quantity (Pounds)	Value
1902.....	225		420		40,000	\$ 2,000	26,000	\$ 1,620
1903.....	610		1,700		115,500	5,760	104,500	6,120
1904.....	780		300		147,500	7,200	18,500	1,200
1905.....	1,120		774		213,400	10,670	48,000	2,870
1906.....	415		200		78,500	3,750	12,500	754
1907.....	85		1,118		15,700	785	251,198	14,821
1908.....			1,554				371,677	26,574
1909.....			2,022	\$ 48,236			1,573,076	115,960
1910.....			2,899	69,959			2,132,082	115,132
1911.....			3,175	64,296			2,234,000	120,600
1912.....			5,690	113,800			4,552,000	245,800

